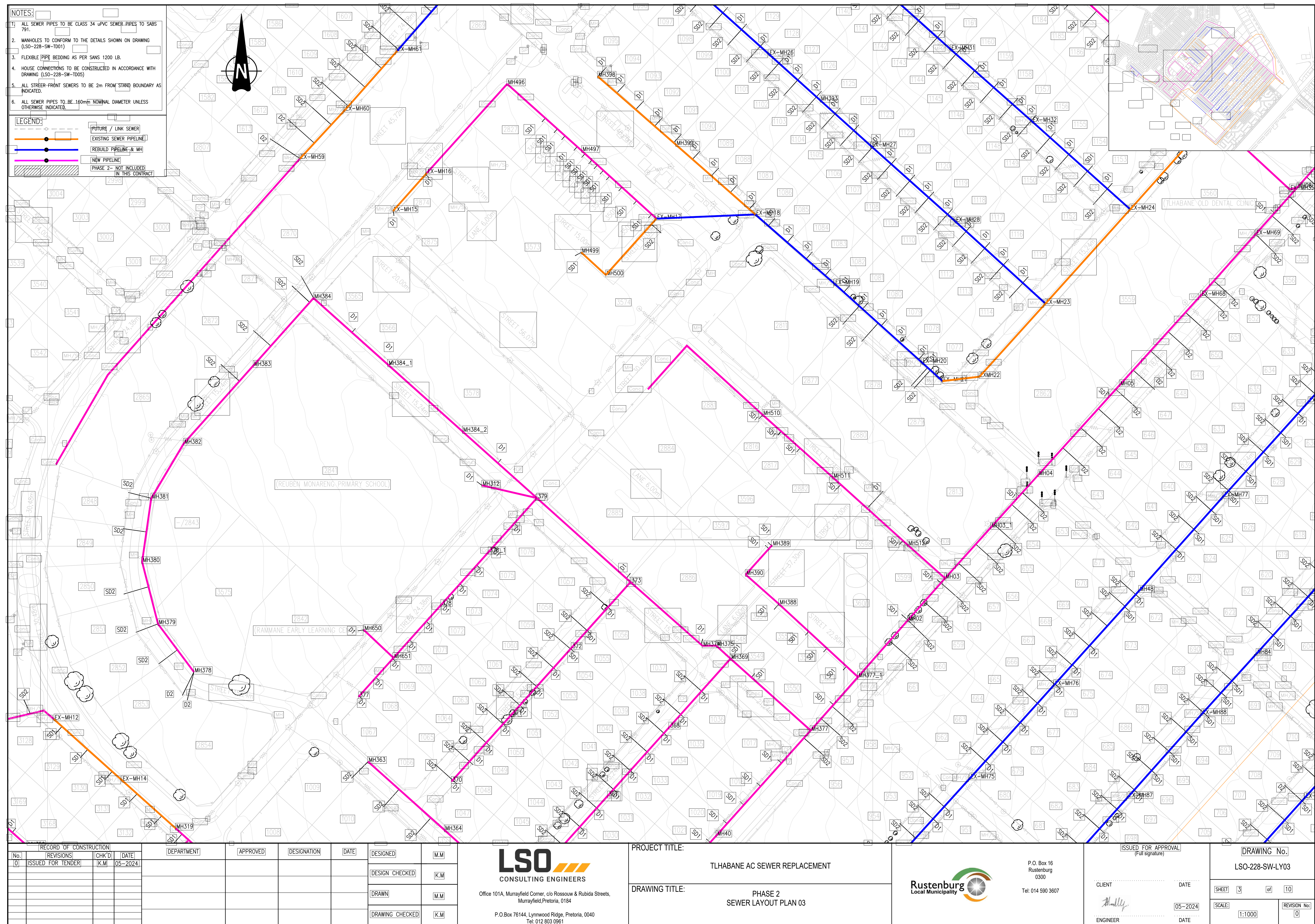


[illegible]



1. ALL ELEMENTS TO BE DISPLAYED IN FULL COLOUR ON A SEMI-MATT WHITE BACKGROUND
2. DESCRIPTION : MATT – BACK
3. BORDER BLUE NON-REFLECTORIZED
4. 1 SIGN BOARD SHALL BE ERECTED AT POSITION TO BE INDICATED BY THE PROJECT MANAGER
5. EPWP LOGO IS AVAILABLE ON PUBLIC WORKS WEBSITE www.publicworks.gov.za

[illegible]





RECORD OF CONSTRUCTION				DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M
No.	REVISIONS	CHK'D	DATE						
0	ISSUED FOR TENDER	K.M	05-2024					DESIGN CHECKED	K.M
								DRAWN	M.M
								DRAWING CHECKED	K.M

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
PHASE 2
SEWER LAYOUT PLAN 01

Rustenburg
Local Municipality

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT: _____ DATE: 05-2024

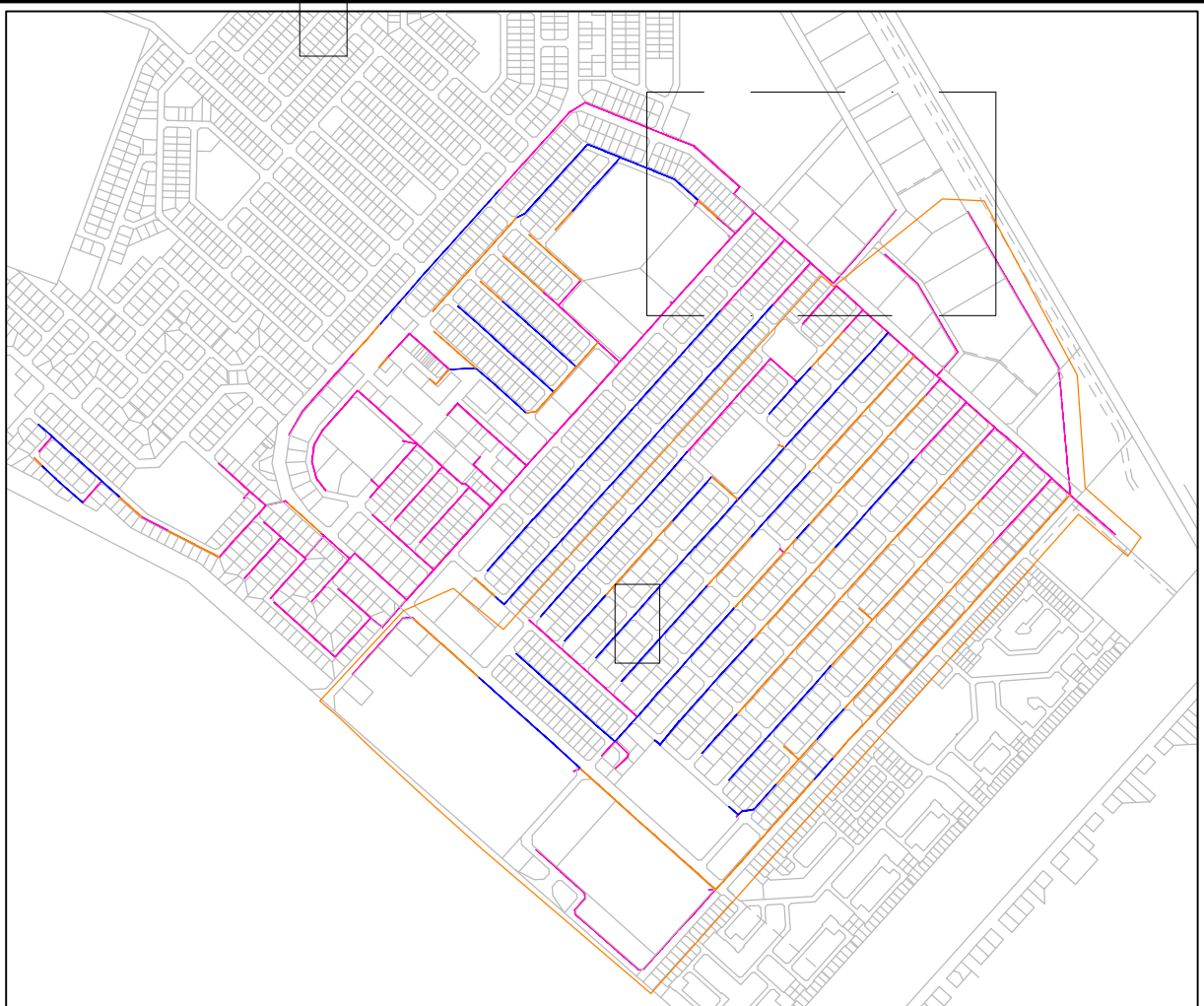
ENGINEER: *Handwritten Signature* DATE: _____

DRAWING No.
LSO-228-SW-LY01

SHEET 1 of 10

SCALE: 1:1000

REVISION No: 0



1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
5. ALL STREET FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

Legend:

- FUTURE / LINK SEWER
- EXISTING SEWER PIPELINE
- REBUILD PIPELINE & MH
- NEW PIPELINE
- PHASE 2 - NOT INCLUDED IN THIS CONTRACT

LSO 
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

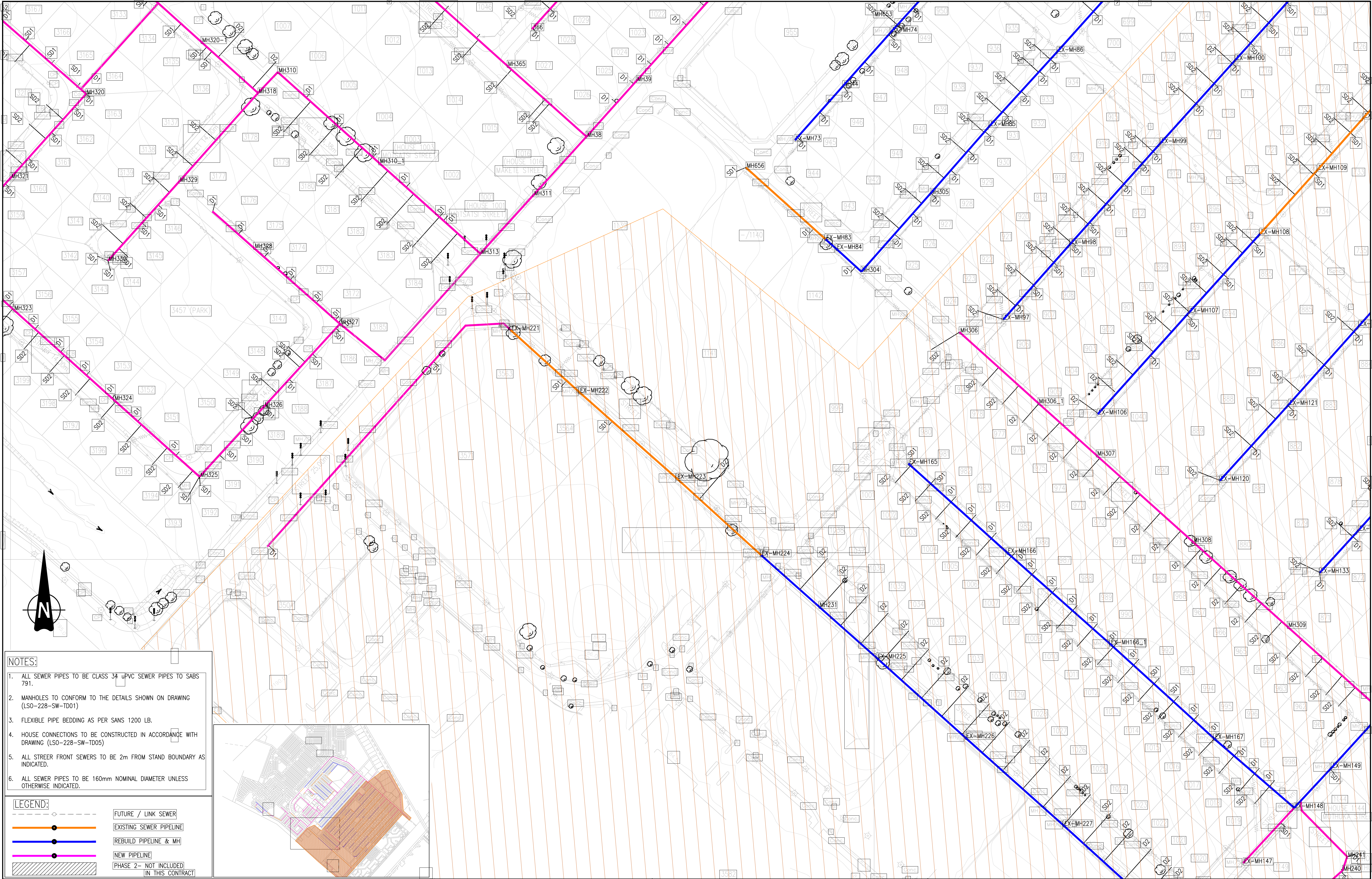
Rustenburg
Local Municipality



P.O. Box 16
Rustenburg
0300

Tel: 014 590 3607

DRAWING No.			
LSO-228-SW-LY02			
SHEET	2	of	10
SCALE:		REVISION No:	
1:1000		1	



- NOTES:**
1. ALL SEWER PIPES TO BE CLASS 34 UPVC SEWER PIPES TO SABS 791.
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

	FUTURE / LINK SEWER
	EXISTING SEWER PIPELINE
	REBUILD PIPELINE & MH
	NEW PIPELINE
	PHASE 2- NOT INCLUDED IN THIS CONTRACT

RECORD OF CONSTRUCTION				DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M
No.	REVISIONS	CHK'D	DATE						
0	ISSUED FOR TENDER	K.M	05-2024					DESIGN CHECKED	K.M
								DRAWN	M.M
								DRAWING CHECKED	K.M

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
PHASE 2
SEWER LAYOUT PLAN 06

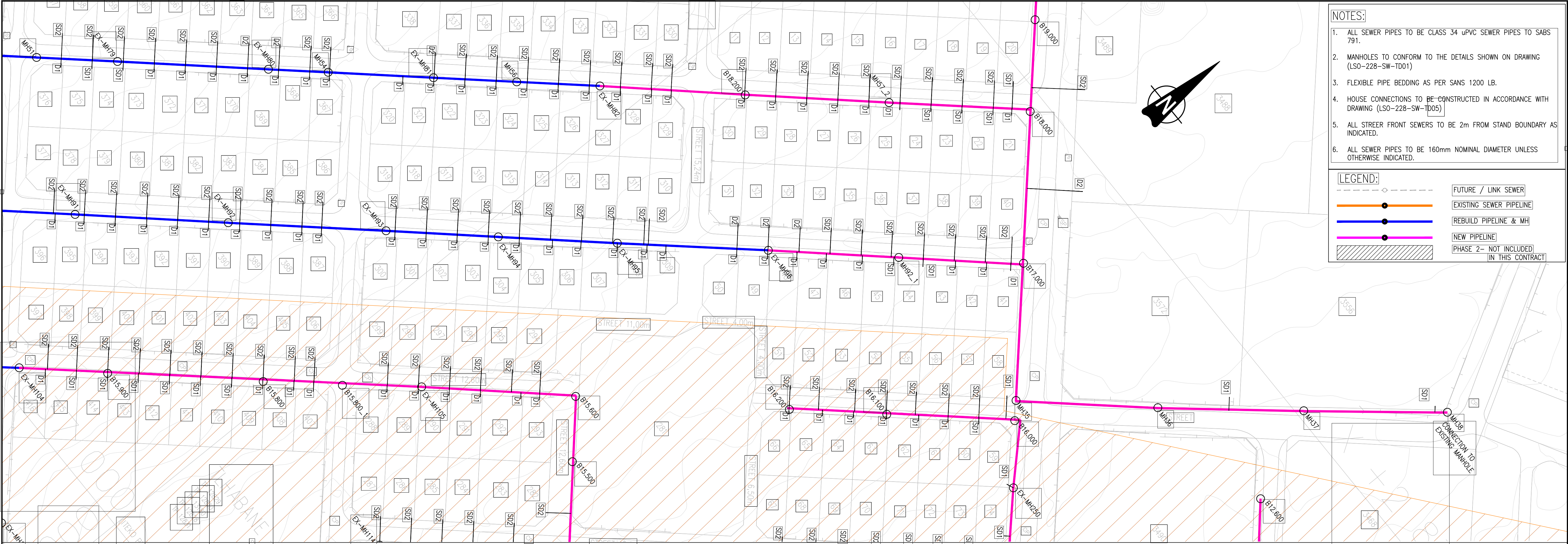
P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT: _____ DATE: _____

ENGINEER: *Handwritten Signature* DATE: 05-2024

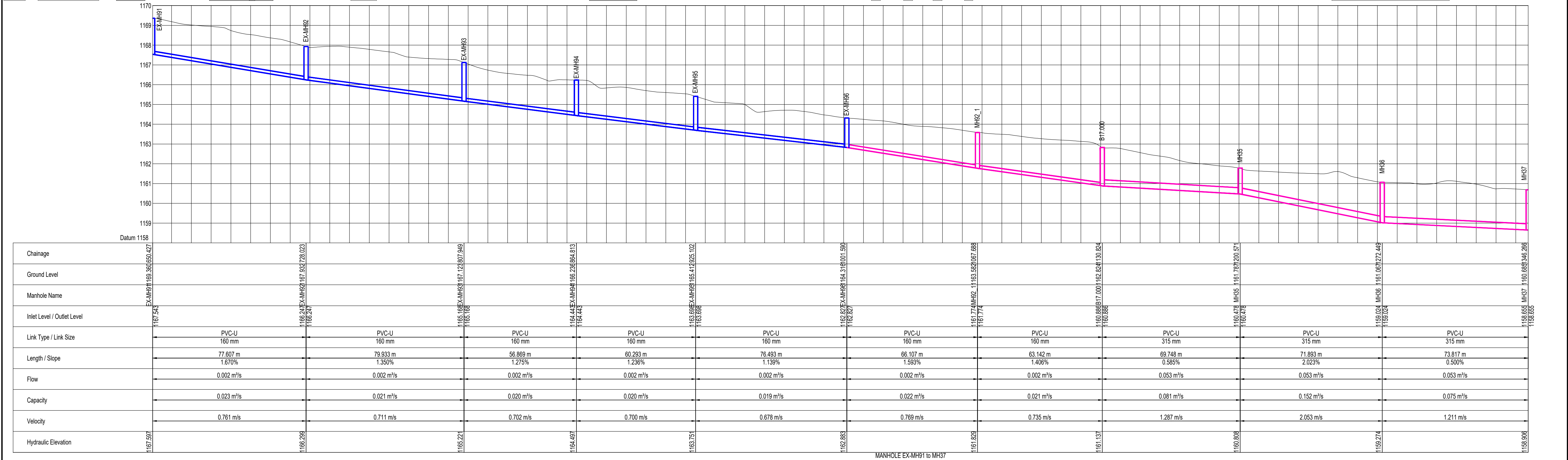
DRAWING No.	
LSO-228-SW-LY06	
SHEET 6 of 10	REVISION No: 1
SCALE: 1:1000	



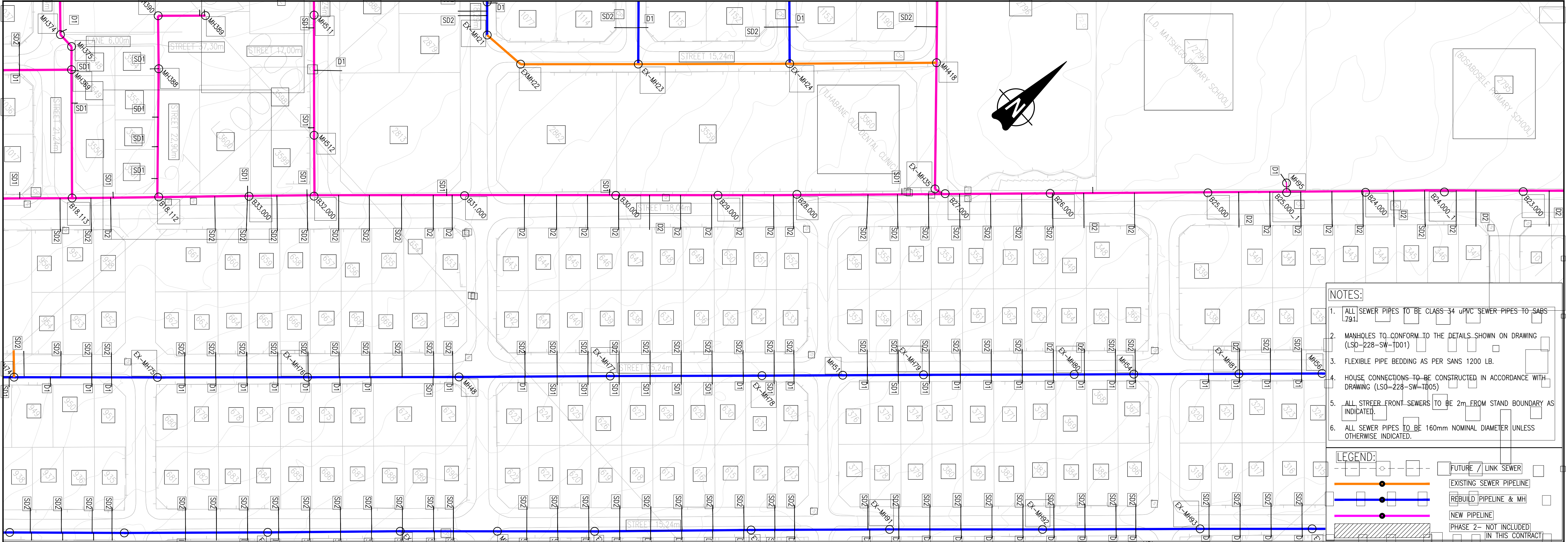
- NOTES:
1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

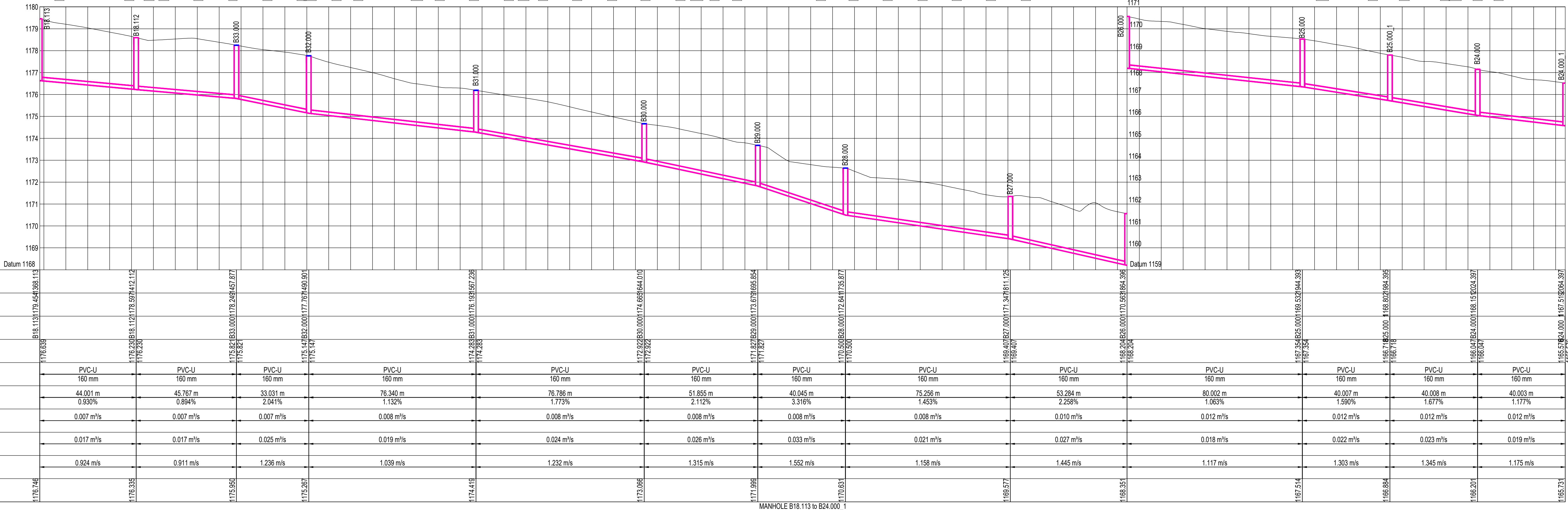
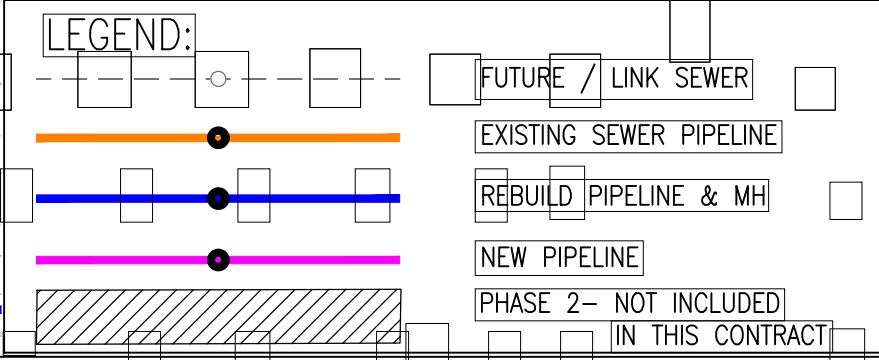
	FUTURE / LINK SEWER
	EXISTING SEWER PIPELINE
	REBUILD PIPELINE & MH
	NEW PIPELINE
	PHASE 2 - NOT INCLUDED IN THIS CONTRACT



RECORD OF CONSTRUCTION				[DEPARTMENT]	[APPROVED]	[DESIGNATION]	[DATE]	[DESIGNED]	[M.M]	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT	Rustenburg Local Municipality P.O. Box 16 Rustenburg 0300 Tel: 014 590 3807	ISSUED FOR APPROVAL (Full signature) CLIENT DATE 05-2024 ENGINEER DATE	DRAWING No. LSO-228-SW-LS30 SHEET 30 of 51 SCALE: 1:1000 REVISION No.: 0
[No.]	REVISIONS	CHK'D	DATE											
0	ISSUED FOR TENDER	K.M	05-2024											



- NOTES:
1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 7911
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREET FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

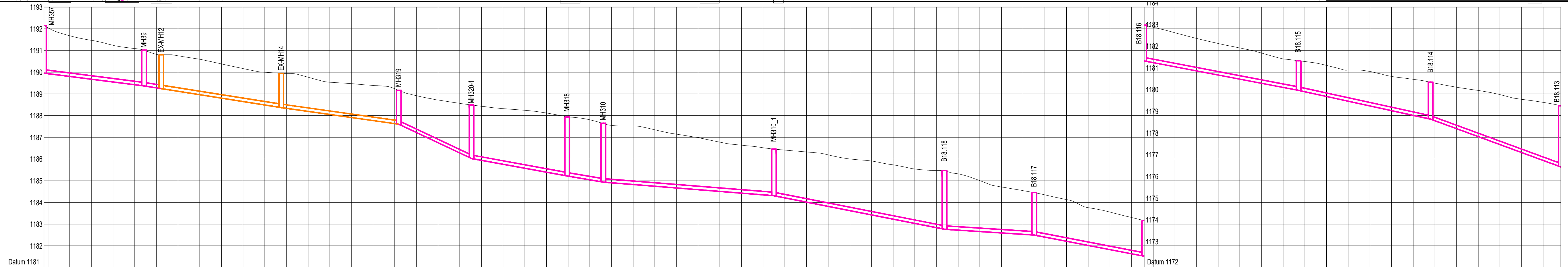
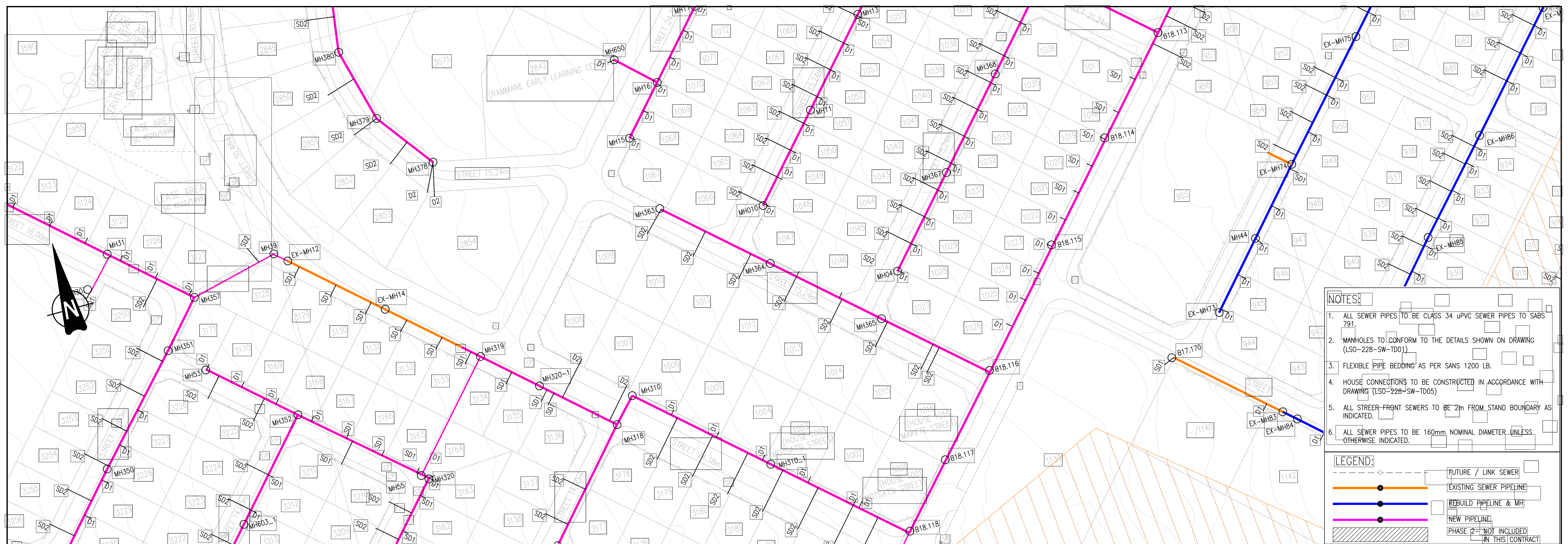


Chainage	B18.113	B18.112	B33.000	B32.000	B31.000	B30.000	B29.000	B28.000	B27.000	B26.000	B25.000	B24.000	B24.000.1
Ground Level	1176.63	1176.23	1175.92	1175.47	1174.23	1172.92	1171.62	1170.30	1169.07	1168.24	1167.54	1166.78	1165.57
Manhole Name	B18.113	B18.112	B33.000	B32.000	B31.000	B30.000	B29.000	B28.000	B27.000	B26.000	B25.000	B24.000	B24.000.1
Inlet Level / Outlet Level	1176.63	1176.23	1175.92	1175.47	1174.23	1172.92	1171.62	1170.30	1169.07	1168.24	1167.54	1166.78	1165.57
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	44.001 m 0.930%	45.767 m 0.894%	33.031 m 2.041%	76.340 m 1.132%	76.786 m 1.773%	51.855 m 2.112%	40.045 m 1.453%	75.256 m 2.258%	53.284 m 1.063%	80.002 m 1.677%	40.007 m 1.590%	40.008 m 1.677%	40.003 m 1.177%
Flow	0.007 m³/s	0.007 m³/s	0.007 m³/s	0.008 m³/s	0.008 m³/s	0.008 m³/s	0.008 m³/s	0.008 m³/s	0.010 m³/s	0.012 m³/s	0.012 m³/s	0.012 m³/s	0.012 m³/s
Capacity	0.017 m³/s	0.017 m³/s	0.025 m³/s	0.019 m³/s	0.024 m³/s	0.026 m³/s	0.033 m³/s	0.021 m³/s	0.027 m³/s	0.018 m³/s	0.022 m³/s	0.023 m³/s	0.019 m³/s
Velocity	0.924 m/s	0.911 m/s	1.236 m/s	1.039 m/s	1.232 m/s	1.315 m/s	1.552 m/s	1.158 m/s	1.445 m/s	1.117 m/s	1.303 m/s	1.345 m/s	1.175 m/s
Hydraulic Elevation	1176.46	1176.93	1175.60	1175.26	1174.19	1173.06	1171.98	1170.63	1169.37	1168.35	1167.51	1166.20	1165.73

RECORD OF CONSTRUCTION				DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M.	DESIGN CHECKED	K.M.	DRAWN	M.M.	DRAWING CHECKED	K.M.	PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT	DRAWING TITLE: PHASE 2 SEWER LONGSECTION 33 MANHOLE B18.113 TO B24.000_1		P.O. Box 16 Rustenburg 0300 Tel: 014 590 3807	ISSUED FOR APPROVAL (Full signature) CLIENT DATE 05-2024 ENGINEER	DRAWING No. LSO-228-SW-LS33	SHEET 33 of 51	SCALE: 1:1000	REVISION No: 0
No.	REVISIONS	CHK'D	DATE																					
0	ISSUED FOR TENDER	K.M.	05-2024																					

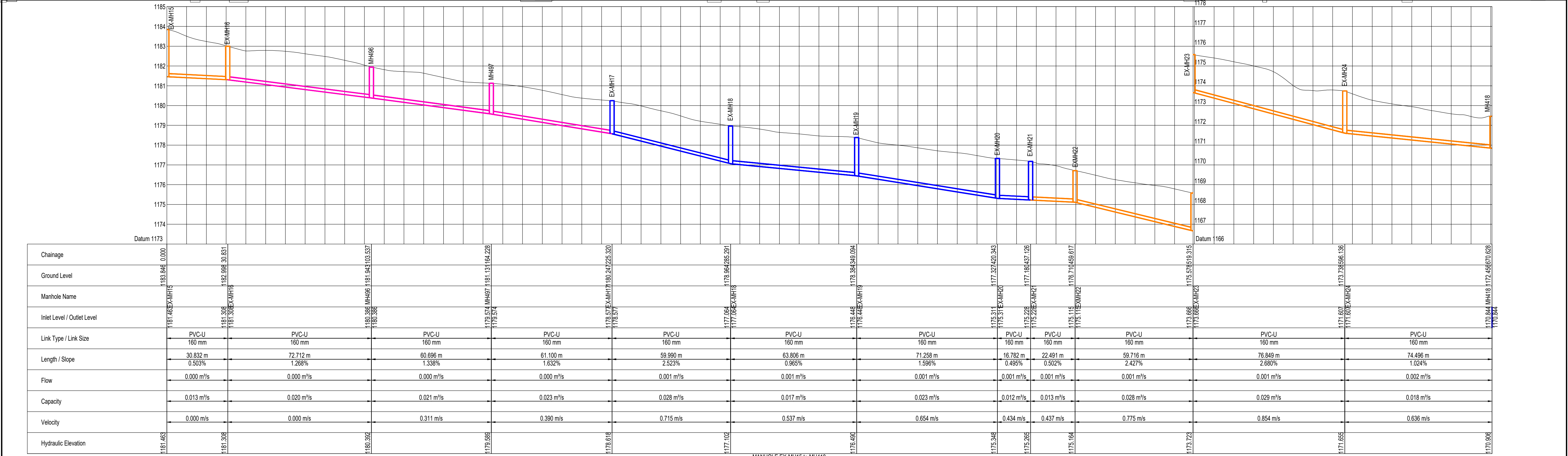
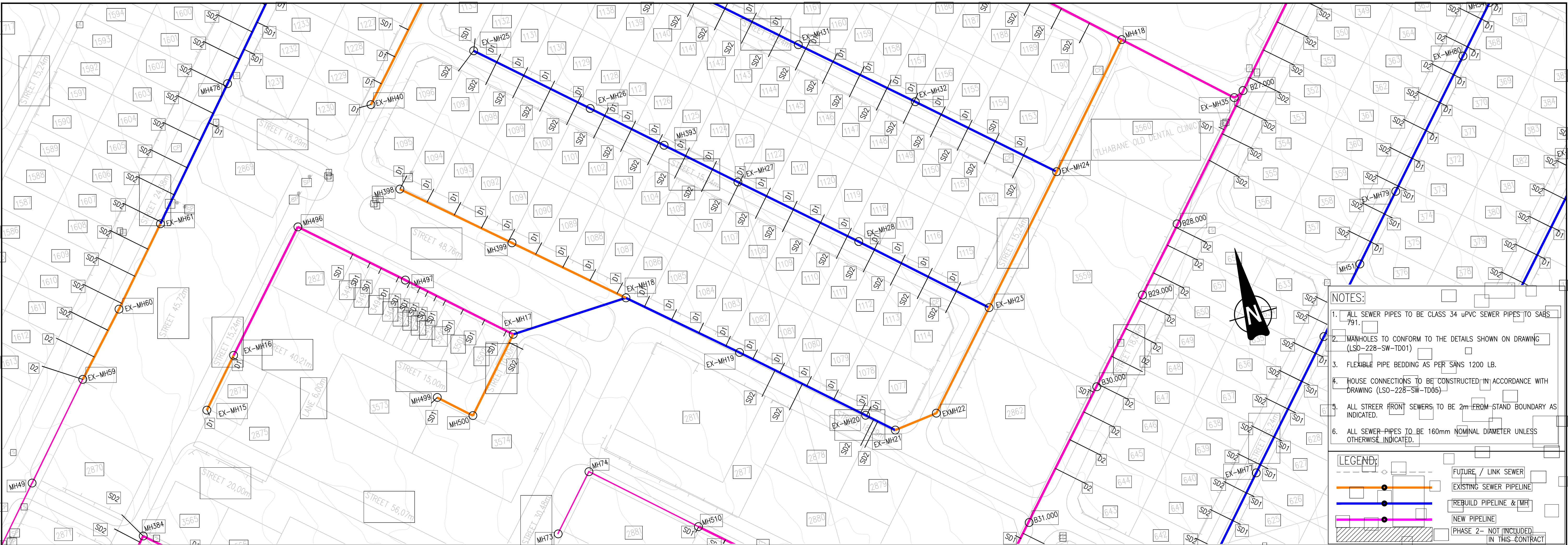


Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184
P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961



Chainage	1183.56		1183.57		1183.58		1183.59		1183.60		1183.61		1183.62		1183.63		1183.64		1183.65		1183.66		1183.67		1183.68		1183.69		1183.70		1183.71		1183.72		1183.73		1183.74		1183.75		1183.76		1183.77		1183.78		1183.79		1183.80		1183.81		1183.82		1183.83		1183.84		1183.85		1183.86		1183.87		1183.88		1183.89		1183.90		1183.91		1183.92		1183.93		1183.94		1183.95		1183.96		1183.97		1183.98		1183.99		1184.00		1184.01		1184.02		1184.03		1184.04		1184.05		1184.06		1184.07		1184.08		1184.09		1184.10		1184.11		1184.12		1184.13		1184.14		1184.15		1184.16		1184.17		1184.18		1184.19		1184.20		1184.21		1184.22		1184.23		1184.24		1184.25		1184.26		1184.27		1184.28		1184.29		1184.30		1184.31		1184.32		1184.33		1184.34		1184.35		1184.36		1184.37		1184.38		1184.39		1184.40		1184.41		1184.42		1184.43		1184.44		1184.45		1184.46		1184.47		1184.48		1184.49		1184.50		1184.51		1184.52		1184.53		1184.54		1184.55		1184.56		1184.57		1184.58		1184.59		1184.60		1184.61		1184.62		1184.63		1184.64		1184.65		1184.66		1184.67		1184.68		1184.69		1184.70		1184.71		1184.72		1184.73		1184.74		1184.75		1184.76		1184.77		1184.78		1184.79		1184.80		1184.81		1184.82		1184.83		1184.84		1184.85		1184.86		1184.87		1184.88		1184.89		1184.90		1184.91		1184.92		1184.93		1184.94		1184.95		1184.96		1184.97		1184.98		1184.99		1185.00		1185.01		1185.02		1185.03		1185.04		1185.05		1185.06		1185.07		1185.08		1185.09		1185.10		1185.11		1185.12		1185.13		1185.14		1185.15		1185.16		1185.17		1185.18		1185.19		1185.20		1185.21		1185.22		1185.23		1185.24		1185.25		1185.26		1185.27		1185.28		1185.29		1185.30		1185.31		1185.32		1185.33		1185.34		1185.35		1185.36		1185.37		1185.38		1185.39		1185.40		1185.41		1185.42		1185.43		1185.44		1185.45		1185.46		1185.47		1185.48		1185.49		1185.50		1185.51		1185.52		1185.53		1185.54		1185.55		1185.56		1185.57		1185.58		1185.59		1185.60		1185.61		1185.62		1185.63		1185.64		1185.65		1185.66		1185.67		1185.68		1185.69		1185.70		1185.71		1185.72		1185.73		1185.74		1185.75		1185.76		1185.77		1185.78		1185.79		1185.80		1185.81		1185.82		1185.83		1185.84		1185.85		1185.86		1185.87		1185.88		1185.89		1185.90		1185.91		1185.92		1185.93		1185.94		1185.95		1185.96		1185.97		1185.98		1185.99		1186.00		1186.01		1186.02		1186.03		1186.04		1186.05		1186.06		1186.07		1186.08		1186.09		1186.10		1186.11		1186.12		1186.13		1186.14		1186.15		1186.16		1186.17		1186.18		1186.19		1186.20		1186.21		1186.22		1186.23		1186.24		1186.25		1186.26		1186.27		1186.28		1186.29		1186.30		1186.31		1186.32		1186.33		1186.34		1186.35		1186.36		1186.37		1186.38		1186.39		1186.40		1186.41		1186.42		1186.43		1186.44		1186.45		1186.46		1186.47		1186.48		1186.49		1186.50		1186.51		1186.52		1186.53		1186.54		1186.55		1186.56		1186.57		1186.58		1186.59		1186.60		1186.61		1186.62		1186.63		1186.64		1186.65		1186.66		1186.67		1186.68		1186.69		1186.70		1186.71		1186.72		1186.73		1186.74		1186.75		1186.76		1186.77		1186.78		1186.79		1186.80		1186.81		1186.82		1186.83		1186.84		1186.85		1186.86		1186.87		1186.88		1186.89		1186.90		1186.91		1186.92		1186.93		1186.94		1186.95		1186.96		1186.97		1186.98		1186.99		1187.00		1187.01		1187.02		1187.03		1187.04		1187.05		1187.06		1187.07		1187.08		1187.09		1187.10		1187.11		1187.12		1187.13		1187.14		1187.15		1187.16		1187.17		1187.18		1187.19		1187.20		1187.21		1187.22		1187.23		1187.24		1187.25		1187.26		1187.27		1187.28		1187.29		1187.30		1187.31		1187.32		1187.33		1187.34		1187.35		1187.36		1187.37		1187.38		1187.39		1187.40		1187.41		1187.42		1187.43		1187.44		1187.45		1187.46		1187.47		1187.48		1187.49		1187.50		1187.51		1187.52		1187.53		1187.54		1187.55		1187.56		1187.57		1187.58		1187.59		1187.60		1187.61		1187.62		1187.63		1187.64		1187.65		1187.66		1187.67		1187.68		1187.69		1187.70		1187.71		1187.72		1187.73		1187.74		1187.75		1187.76		1187.77		1187.78		1187.79		1187.80		1187.81		1187.82		1187.83		1187.84		1187.85		1187.86		1187.87		1187.88		1187.89		1187.90		1187.91		1187.92		1187.93		1187.94		1187.95		1187.96		1187.97		1187.98		1187.99		1188.00		1188.01		1188.02		1188.03		1188.04		1188.05		1188.06		1188.07		1188.08		1188.09		1188.10		1188.11		1188.12		1188.13		1188.14		1188.15		1188.16		1188.17		1188.18		1188.19		1188.20		1188.21		1188.22		1188.23		1188.24		1188.25		1188.26		1188.27		1188.28		1188.29		1188.30		1188.31		1188.32		1188.33		1188.34		1188.35		1188.36		1188.37		1188.38		1188.39		1188.40		1188.41		1188.42		1188.43		1188.44		1188.45		1188.46		1188.47		1188.48		1188.49		1188.50		1188.51		1188.52		1188.53		1188.54		1188.55		1188.56		1188.57		1188.58		1188.59		1188.60		1188.61		1188.62		1188.63		1188.64		1188.65		1188.66		1188.67		1188.68		1188.69		1188.70		1188.71		1188.72		1188.73		1188.74		1188.75		1188.76		1188.77		1188.78		1188.79		1188.80		1188.81		1188.82		1188.83		1188.84		1188.85		1188.86		1188.87		1188.88		1188.89		1188.90		1188.91		1188.92		1188.93		1188.94		1188.95		1188.96		1188.97		1188.98		1188.99		1189.00		1189.01		1189.02		1189.03		1189.04		1189.05		1189.06		1189.07		1189.08		1189.09		1189.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[illegible]



RECORD OF CONSTRUCTION

No.	REVISIONS	CHK'D	DATE
01	ISSUED FOR TENDER	K.M	05-2024

DEPARTMENT	APPROVED	DESIGNATION	DATE

DESIGNED	M.M
DESIGN CHECKED	K.M
DRAWN	M.M
DRAWING CHECKED	K.M

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
PHASE 2
SEWER LONGSECTION 35
MANHOLE EX-MH15 TO MH418

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT
DATE
05-2024

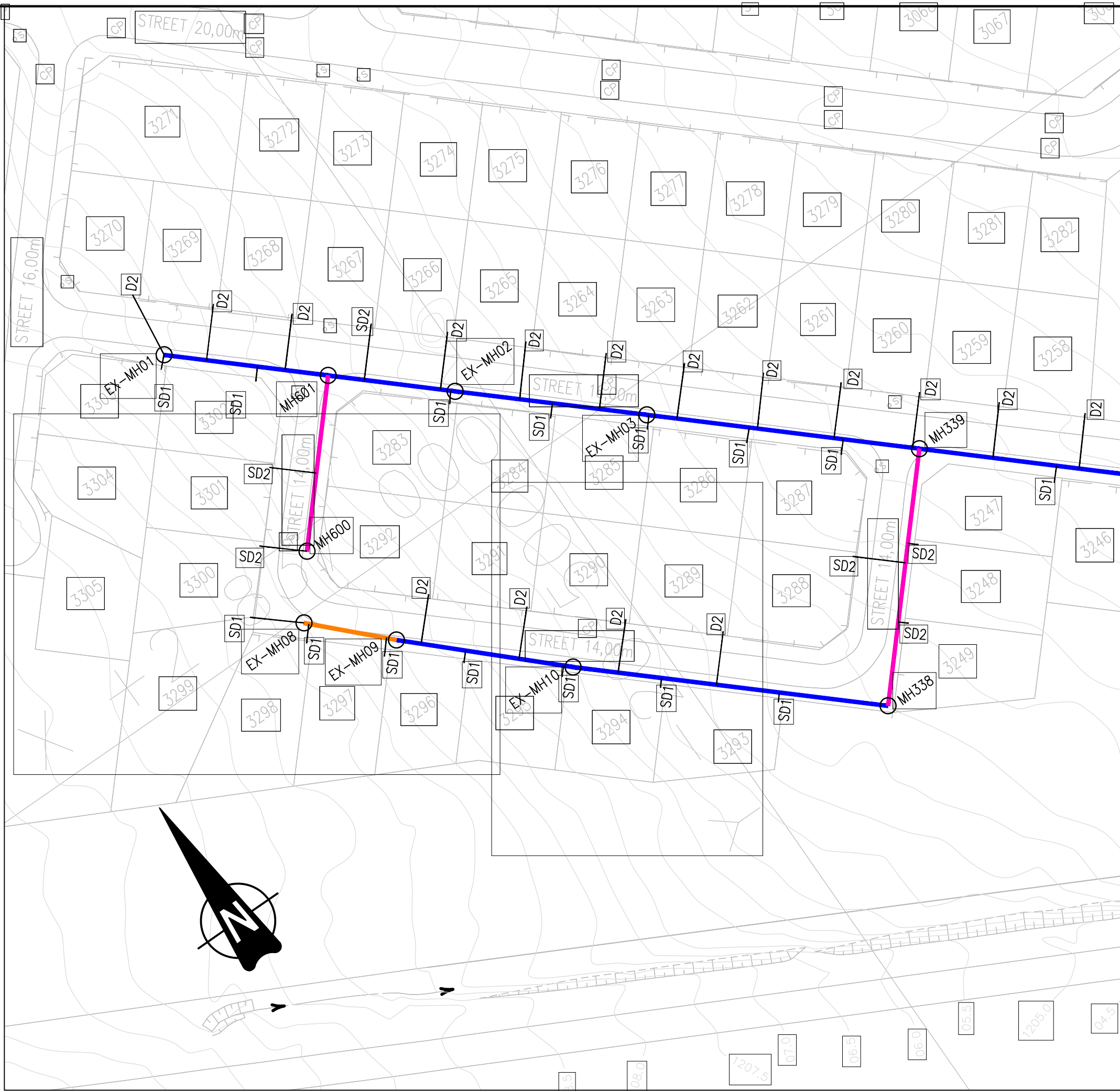
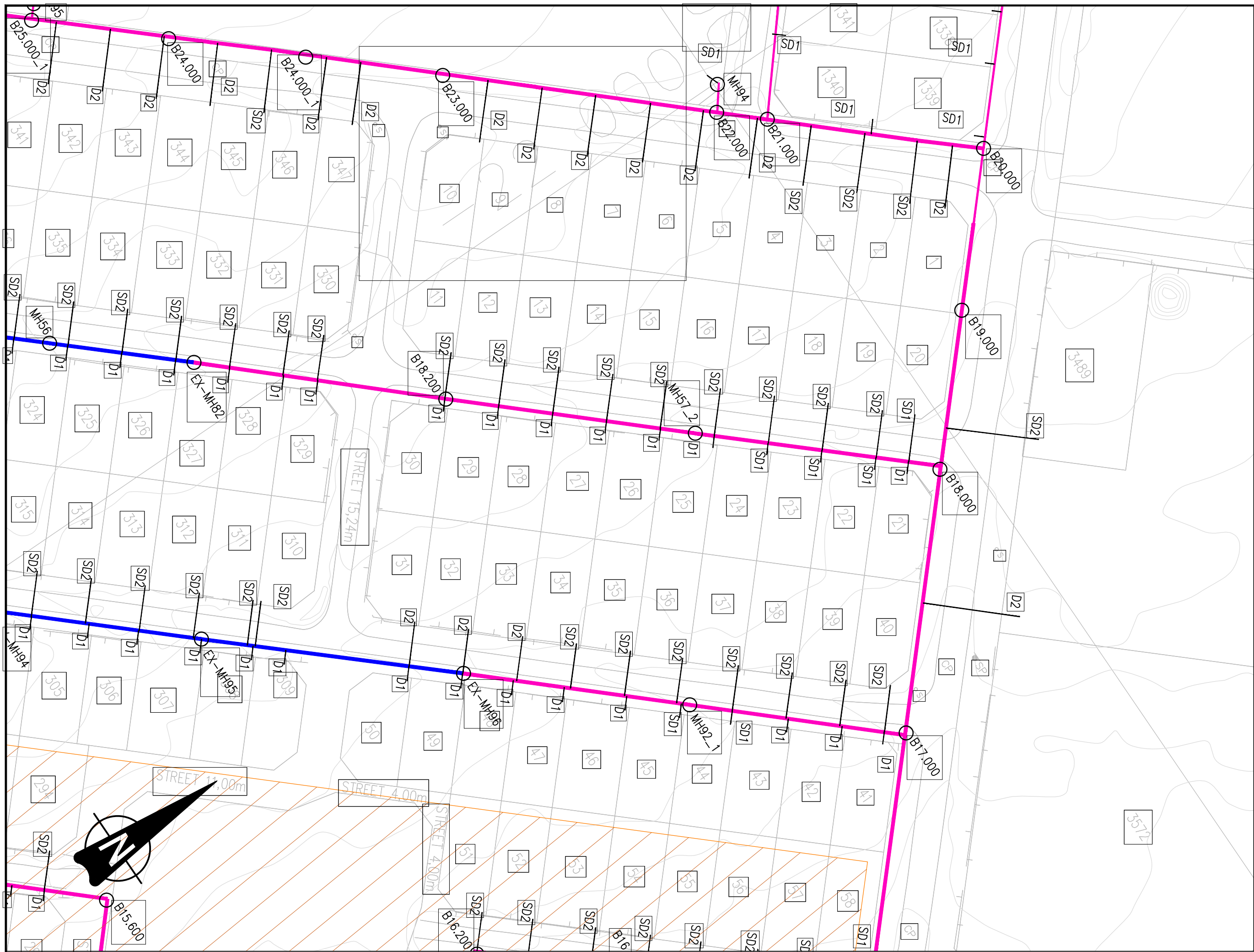
ENGINEER
DATE

DRAWING No.
LSO-228-SW-LS35

SHEET 35 of 51

SCALE: 1:1000

REVISION No: 0



NOTES:

1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.

2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)

3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.

4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)

5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.

6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

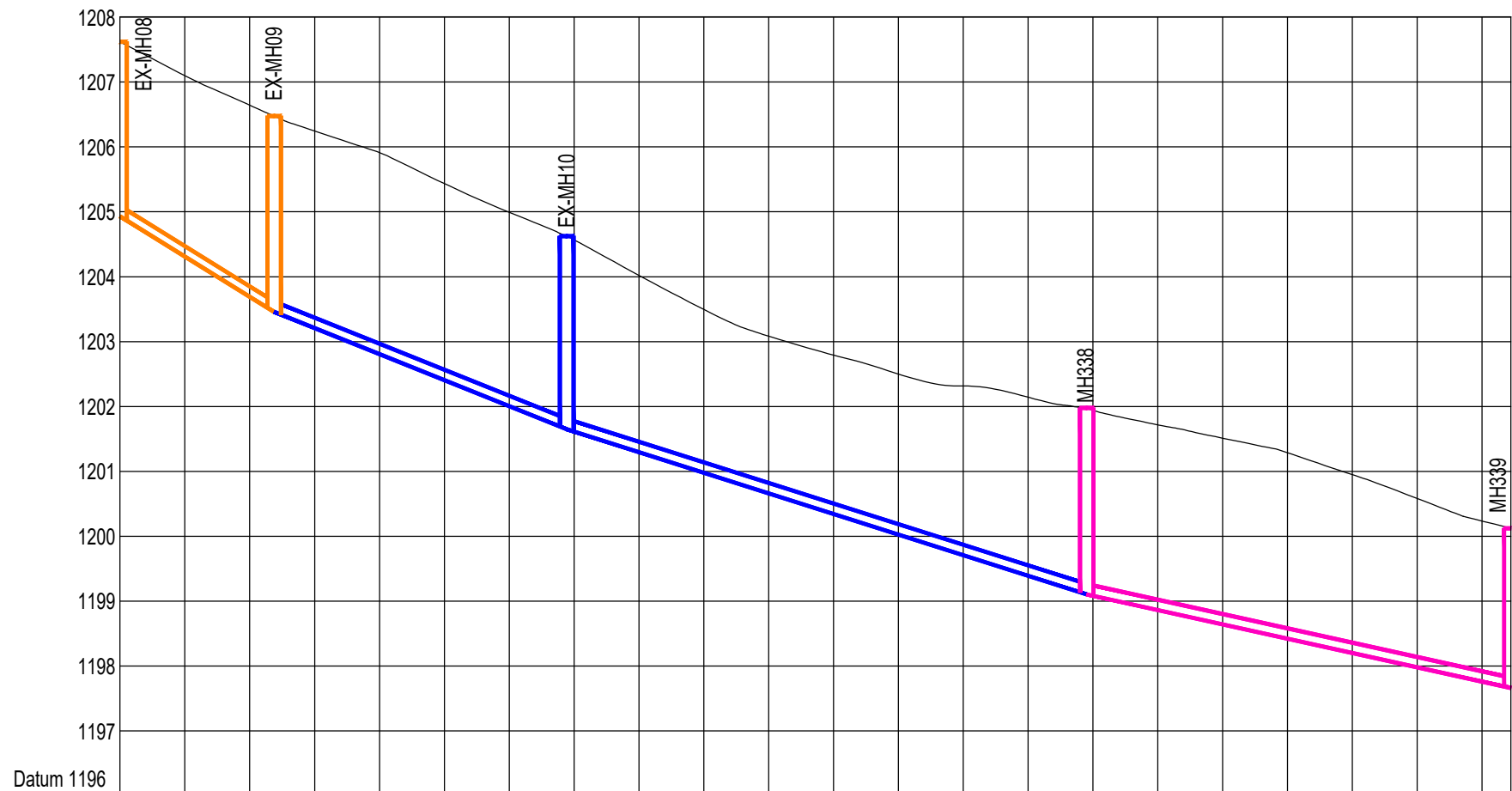
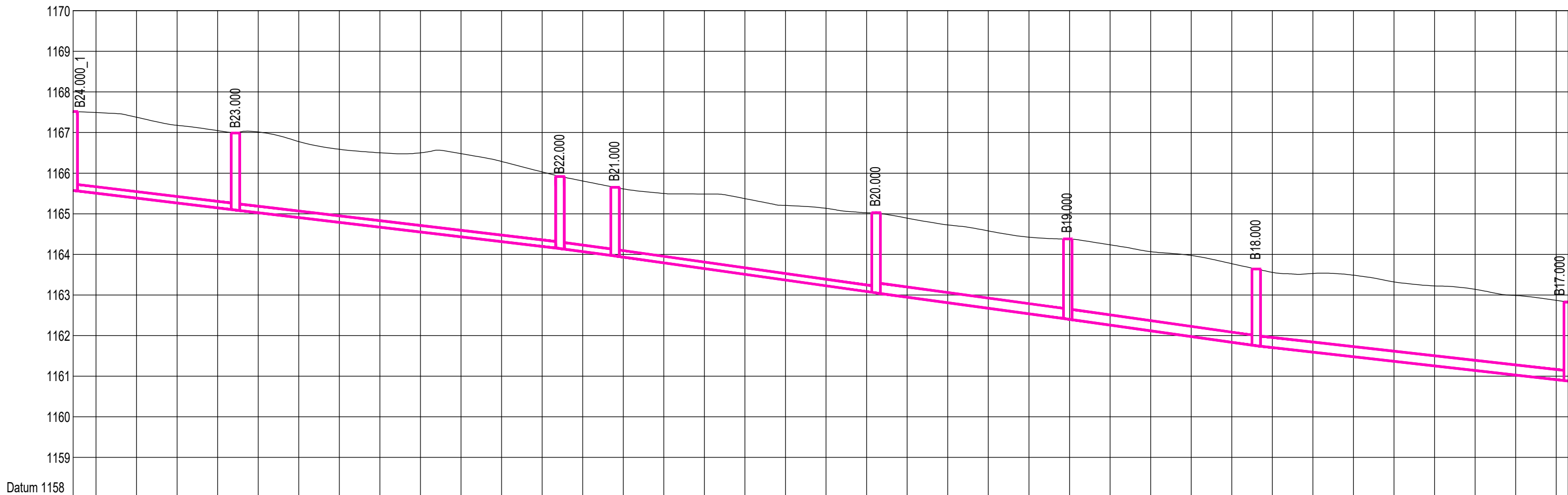
FUTURE / LINK SEWER

EXISTING SEWER PIPELINE

REBUILD PIPELINE & MH

NEW PIPELINE

PHASE 2- NOT INCLUDED IN THIS CONTRACT



Chainage	1167.512064.397	1165.57824.000	1165.09523.000	1165.982104.397	1163.355	1162.42519.000	1161.75518.000	1160.88817.000	1160.888
Ground Level									
Manhole Name									
Inlet Level / Outlet Level									
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 250 mm	PVC-U 250 mm	PVC-U 250 mm	PVC-U 250 mm	
Length / Slope	40.003 m 1.202%	80.005 m 1.185%	13.590 m 1.347%	64.339 m 1.413%	47.250 m 1.361%	46.480 m 1.130%	76.906 m 1.051%		
Flow	0.012 m³/s	0.012 m³/s	0.013 m³/s	0.014 m³/s	0.049 m³/s	0.050 m³/s	0.051 m³/s		
Capacity	0.019 m³/s	0.019 m³/s	0.021 m³/s	0.021 m³/s	0.067 m³/s	0.068 m³/s	0.061 m³/s		
Velocity	1.185 m/s	1.180 m/s	1.253 m/s	1.308 m/s	1.745 m/s	1.774 m/s	1.633 m/s		
Hydraulic Elevation	1165.731	1165.249			1163.354	1162.714	1161.047	1161.178	

Chainage	1207.621 0.000	1203.460	1203.460	1204.624 68.889	1199.120	1197.677
Ground Level						
Manhole Name						
Inlet Level / Outlet Level						
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm		
Length / Slope	23.812 m 3.174%	45.138 m 4.009%	80.215 m 3.174%	65.424 m 2.206%		
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s		
Capacity	0.045 m³/s	0.036 m³/s	0.032 m³/s	0.027 m³/s		
Velocity	0.675 m/s	0.542 m/s	0.481 m/s	0.401 m/s		
Hydraulic Elevation	1204.957	1203.475	1201.667	1199.120	1197.677	

RECORD OF CONSTRUCTION

No.	REVISIONS	CHK'D	DATE
01	ISSUED FOR TENDER	K.M	05-2024

DEPARTMENT

APPROVED

DESIGNATION

DATE

DESIGNED

M.M

DESIGN CHECKED

K.M

DRAWN

M.M

DRAWING CHECKED

K.M

LSO

CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:

TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:

PHASE 2
SEWER LONGSECTION 36
Manhole B24.000_1 to B17.000 & EX-MH08-MH339

Rustenburg

Local Municipality

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT

DATE

05-2024

ENGINEER

DATE

DRAWING No.

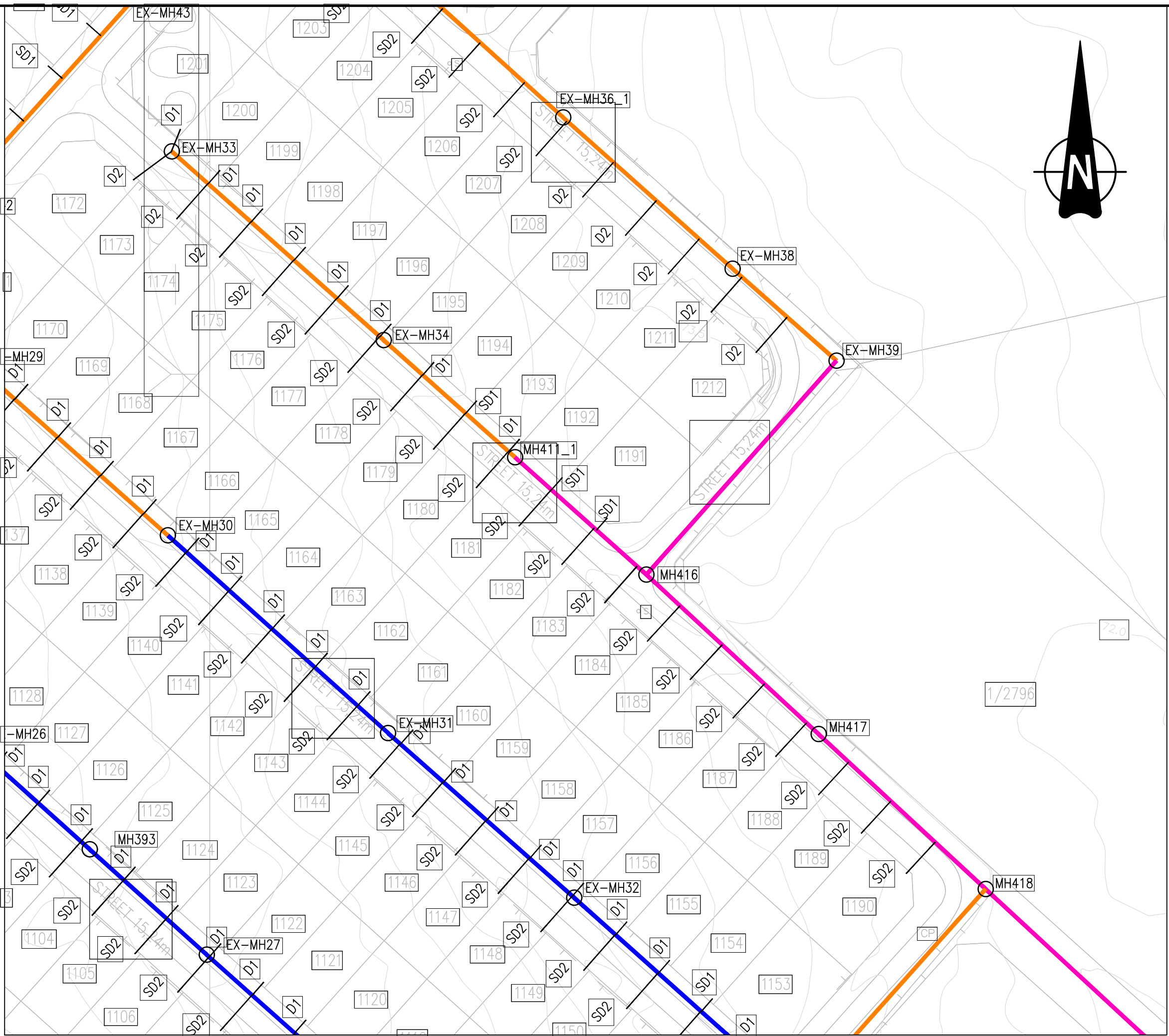
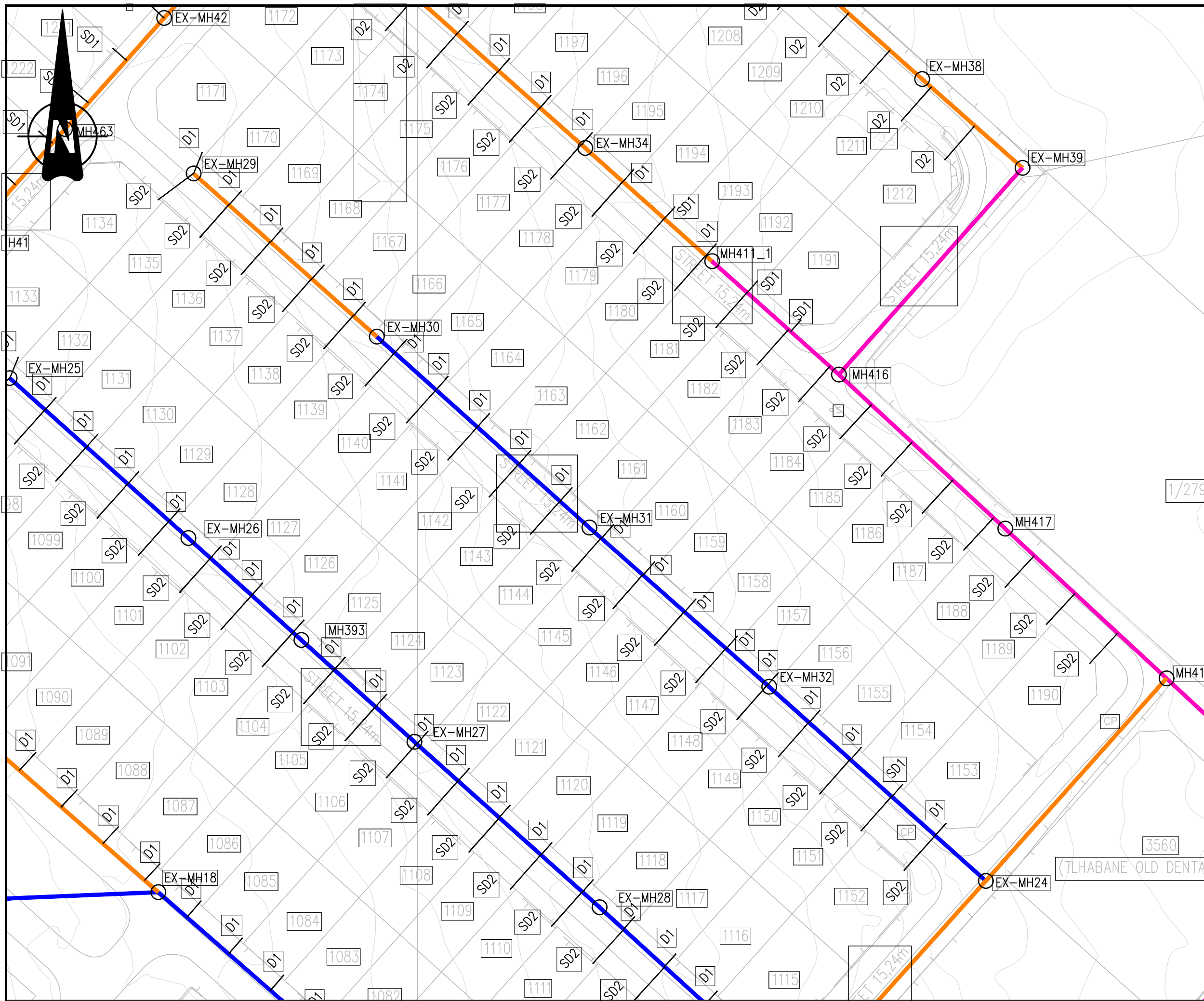
LSO-228-SW-LS36

SHEET 36 of 51

SCALE: 1:1000

REVISION No.

0

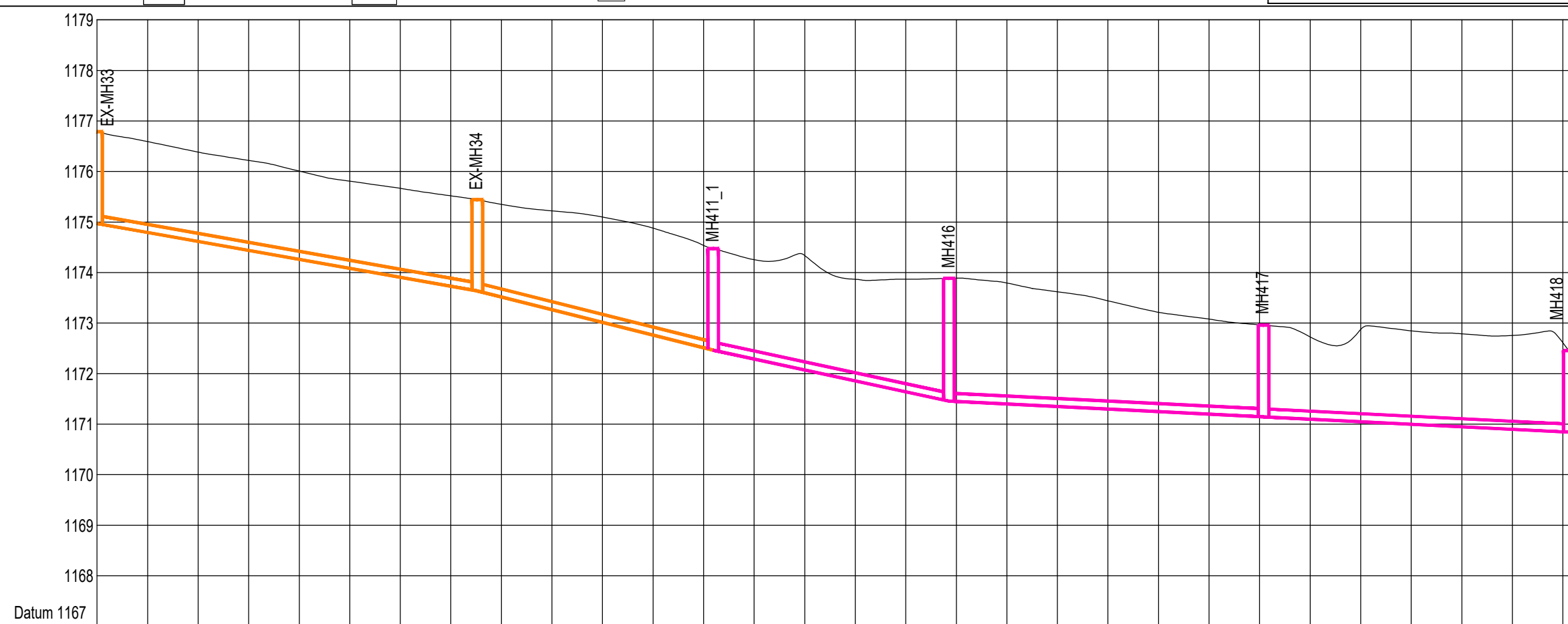


- NOTES:
- ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 - MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 - FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 - HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 - ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 - ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

- LEGEND:
- FUTURE / LINK SEWER
 - EXISTING SEWER PIPELINE
 - REBUILD PIPELINE & MH
 - NEW PIPELINE
 - PHASE 2- NOT INCLUDED IN THIS CONTRACT



Chainage	EX-MH29 0.000	EX-MH30 177.124	EX-MH31 175.683	EX-MH32 175.421	EX-MH24 170.000
Ground Level	1176.544	1175.345	1173.622	1172.345	1171.607
Manhole Name	EX-MH29	EX-MH30	EX-MH31	EX-MH32	EX-MH24
Inlet Level / Outlet Level	1176.544	1175.345	1173.622	1172.345	1171.607
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	
Length / Slope	67.330 m 1.781%	78.479 m 2.196%	65.872 m 1.328%	79.833 m 1.428%	
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s	
Capacity	0.024 m³/s	0.026 m³/s	0.021 m³/s	0.021 m³/s	
Velocity	0.000 m/s	0.400 m/s	0.403 m/s	0.441 m/s	
Hydraulic Elevation	1176.544	1175.345	1173.622	1172.345	1171.607



Chainage	EX-MH33 0.000	EX-MH34 173.441	EX-MH36 173.888	EX-MH38 174.471	EX-MH39 175.544	EX-MH41 176.200	EX-MH46 177.488	EX-MH47 177.957	EX-MH48 178.000
Ground Level	1174.973	1173.833	1172.468	1171.471	1170.886	1170.844	1171.148	1170.844	1170.844
Manhole Name	EX-MH33	EX-MH34	EX-MH36	EX-MH38	EX-MH39	EX-MH41	EX-MH46	EX-MH47	EX-MH48
Inlet Level / Outlet Level	1174.973	1173.833	1172.468	1171.471	1170.886	1170.844	1171.148	1170.844	1170.844
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	75.244 m 1.775%	46.670 m 2.512%	46.667 m 2.160%	62.240 m 0.501%	60.389 m 0.500%				
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s				
Capacity	0.024 m³/s	0.028 m³/s	0.026 m³/s	0.012 m³/s	0.012 m³/s				
Velocity	0.445 m/s	0.539 m/s	0.527 m/s	0.339 m/s	0.345 m/s				
Hydraulic Elevation	1174.973	1173.833	1172.468	1171.471	1170.886	1170.844	1171.148	1170.844	1170.844

RECORD OF CONSTRUCTION				DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M
No.	REVISIONS	CHK'D	DATE						
01	ISSUED FOR TENDER	K.M	05-2024					DESIGN CHECKED	K.M
								DRAWN	M.M
								DRAWING CHECKED	K.M

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
PHASE 2
SEWER LONGSECTION 37
MANHOLE EX-MH29 TO EX-MH24 & EX-MH33 TO MH418

Rustenburg
Local Municipality

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT: _____ DATE: _____

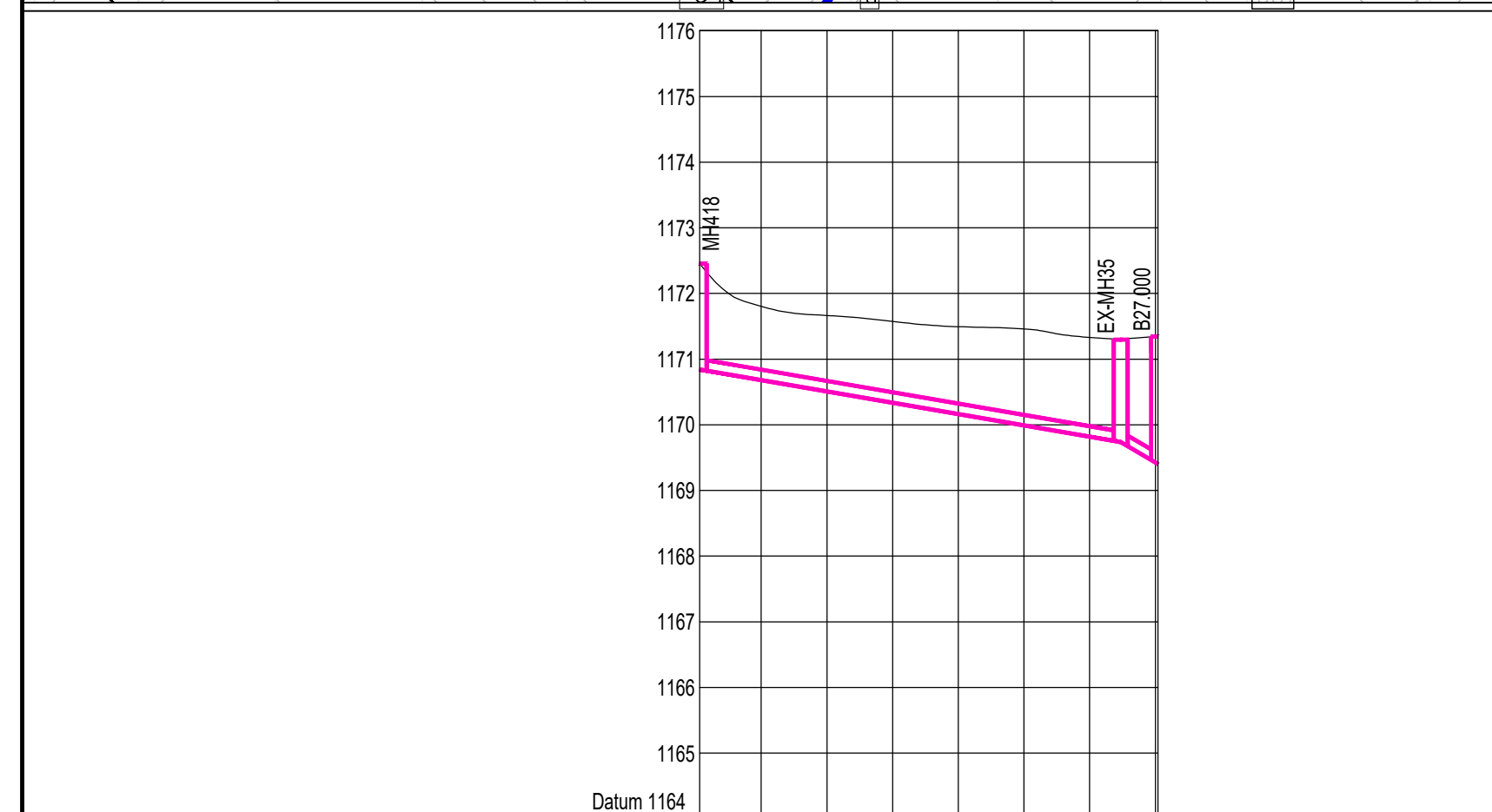
ENGINEER: *Molly* DATE: 05-2024

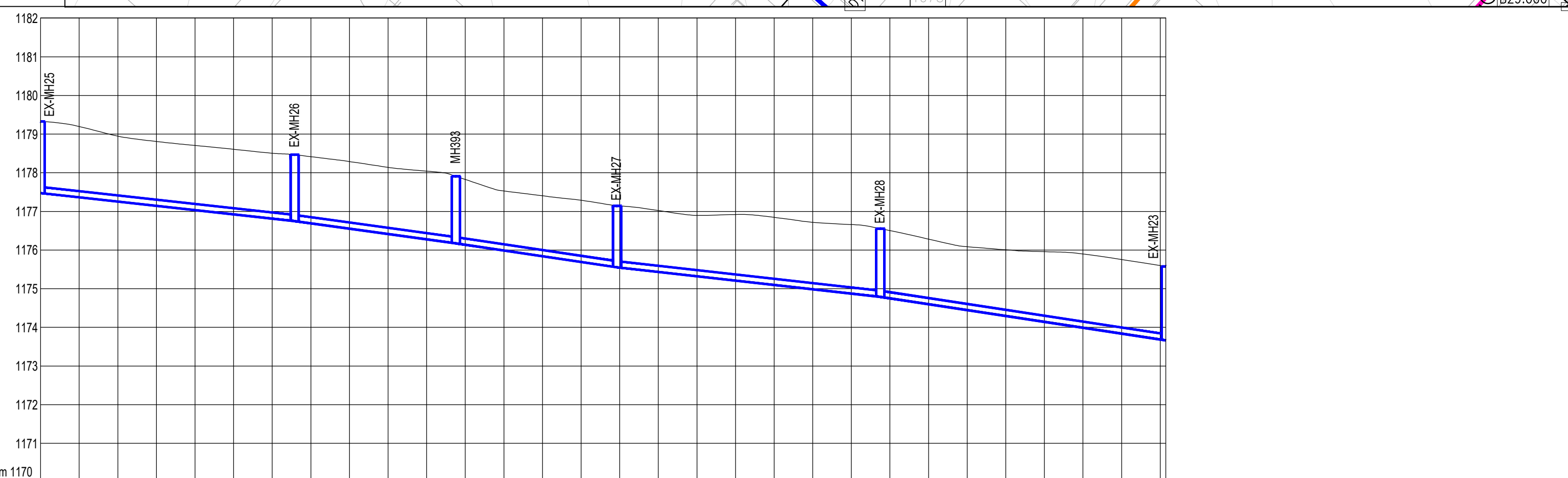
DRAWING No.
LSO-228-SW-LS37

SHEET 37 of 51

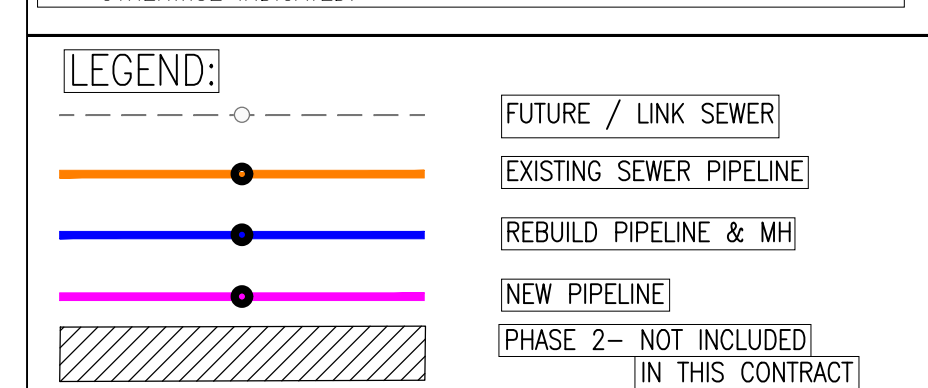
SCALE: 1:1000

REVISION No.
0

MANHOLE MH418 to B27.000



MANHOLE EX-MH25 to EX-MH23

MANHOLE MH95 to B25 000 1

DEPARTMENT	APPROVED	DESIGNATION	DATE

LSO 
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

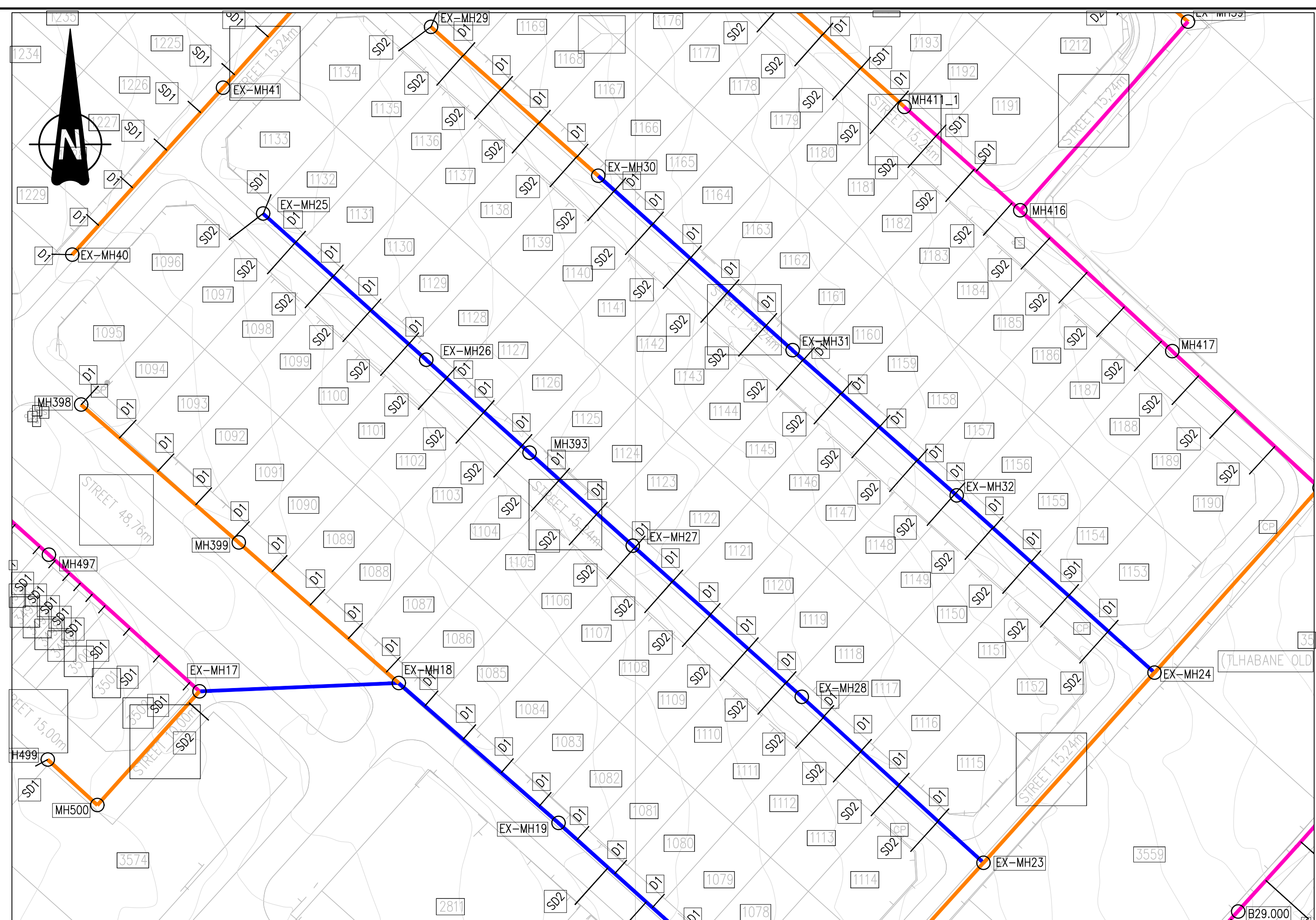
Rustenburg
Local Municipality



P.O. Box 16
Rustenburg
0300

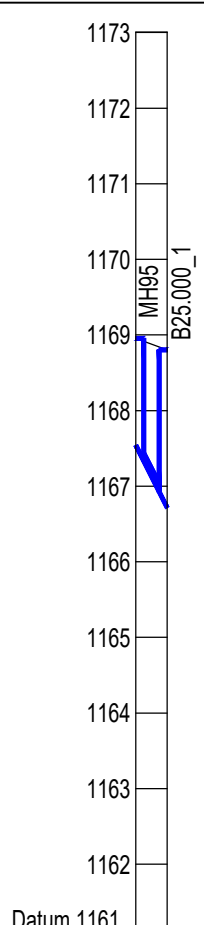
Tel: 014 590 3607

DRAWING No.			
LSO-228-SW-LS38			
SHEET	38	of	51
SCALE:		REVISION No:	
1:1000		0	



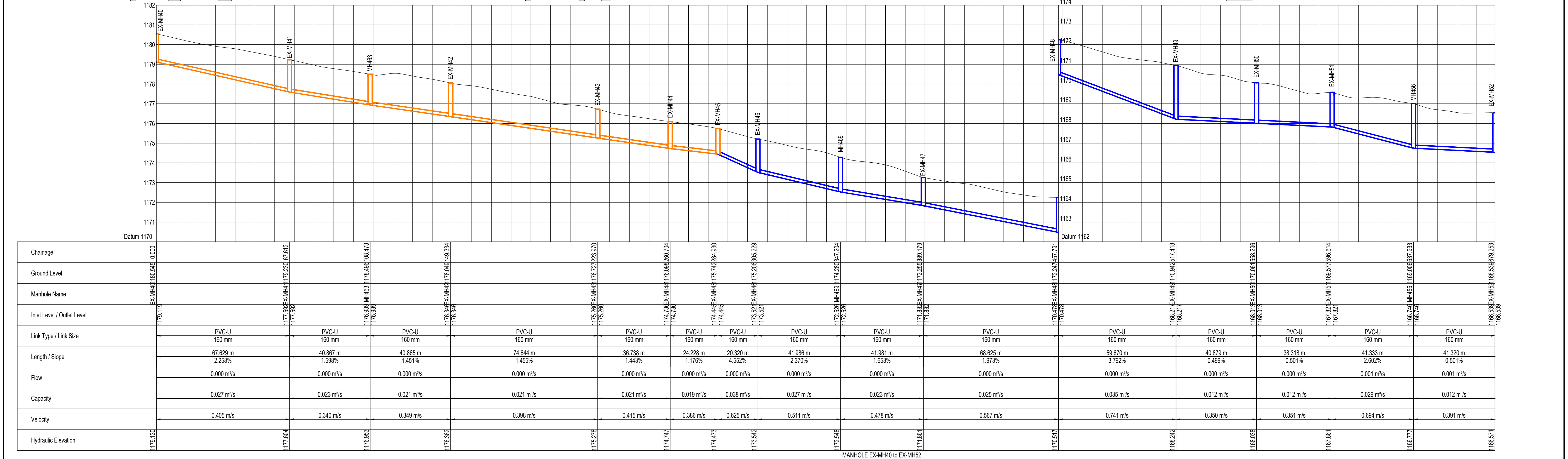
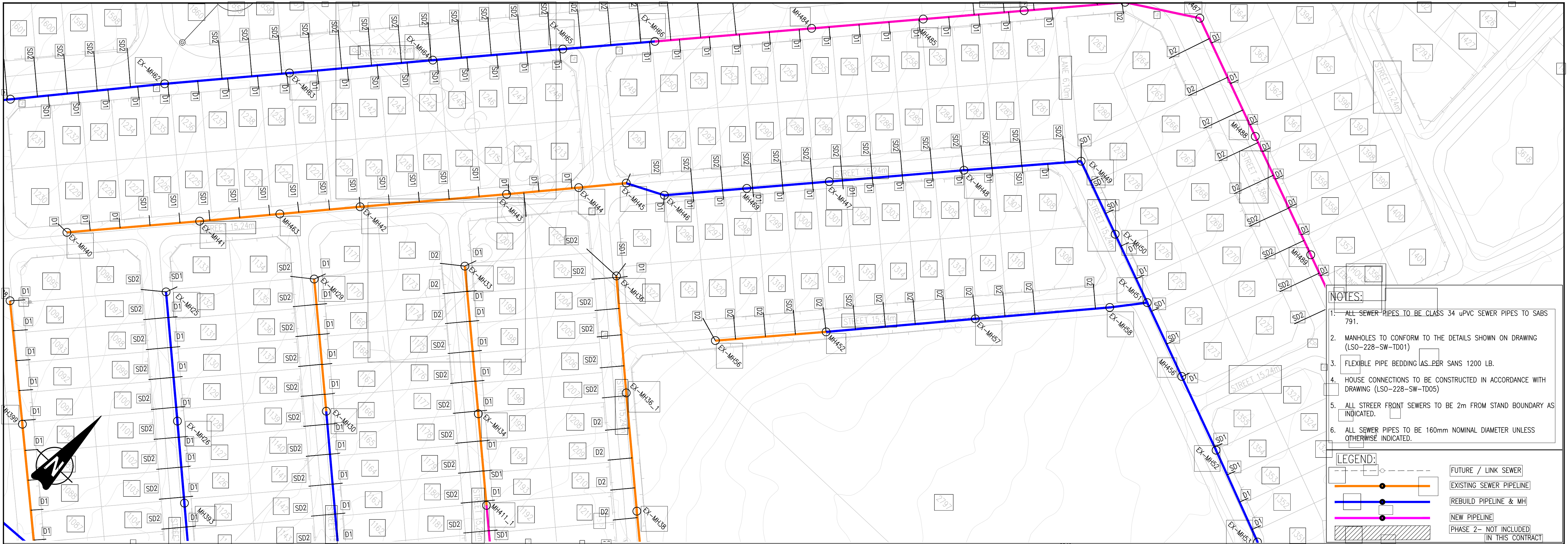
1. ALL SEWER PIPES TO BE CLASS 34 UPVC SEWER PIPES TO SABS 791.
2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
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5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

FUTURE / LINK SEWER
 EXISTING SEWER PIPELINE
 REBUILD PIPELINE & MH
 NEW PIPELINE
 PHASE 2- NOT INCLUDED
 IN THIS CONTRACT

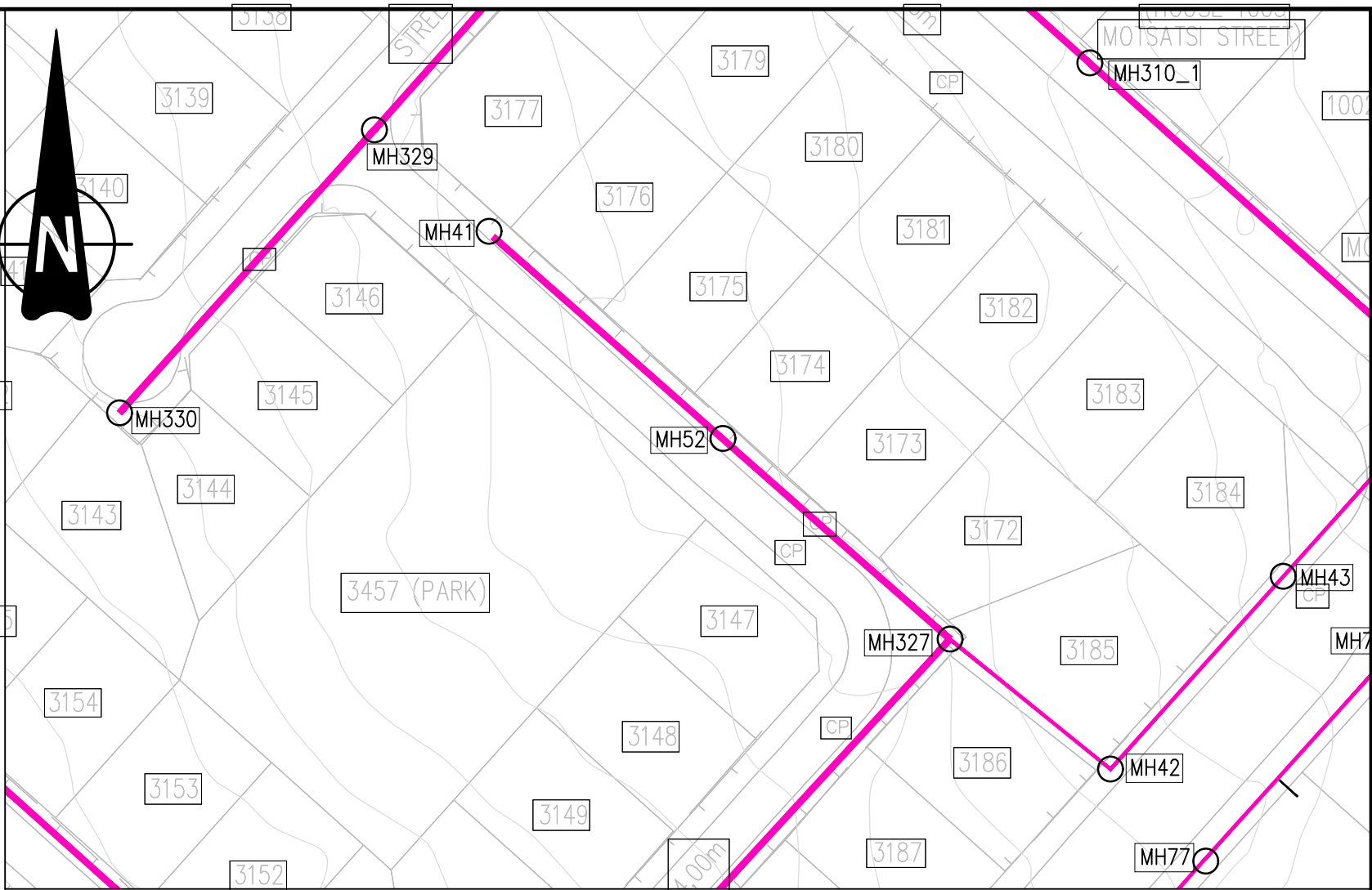
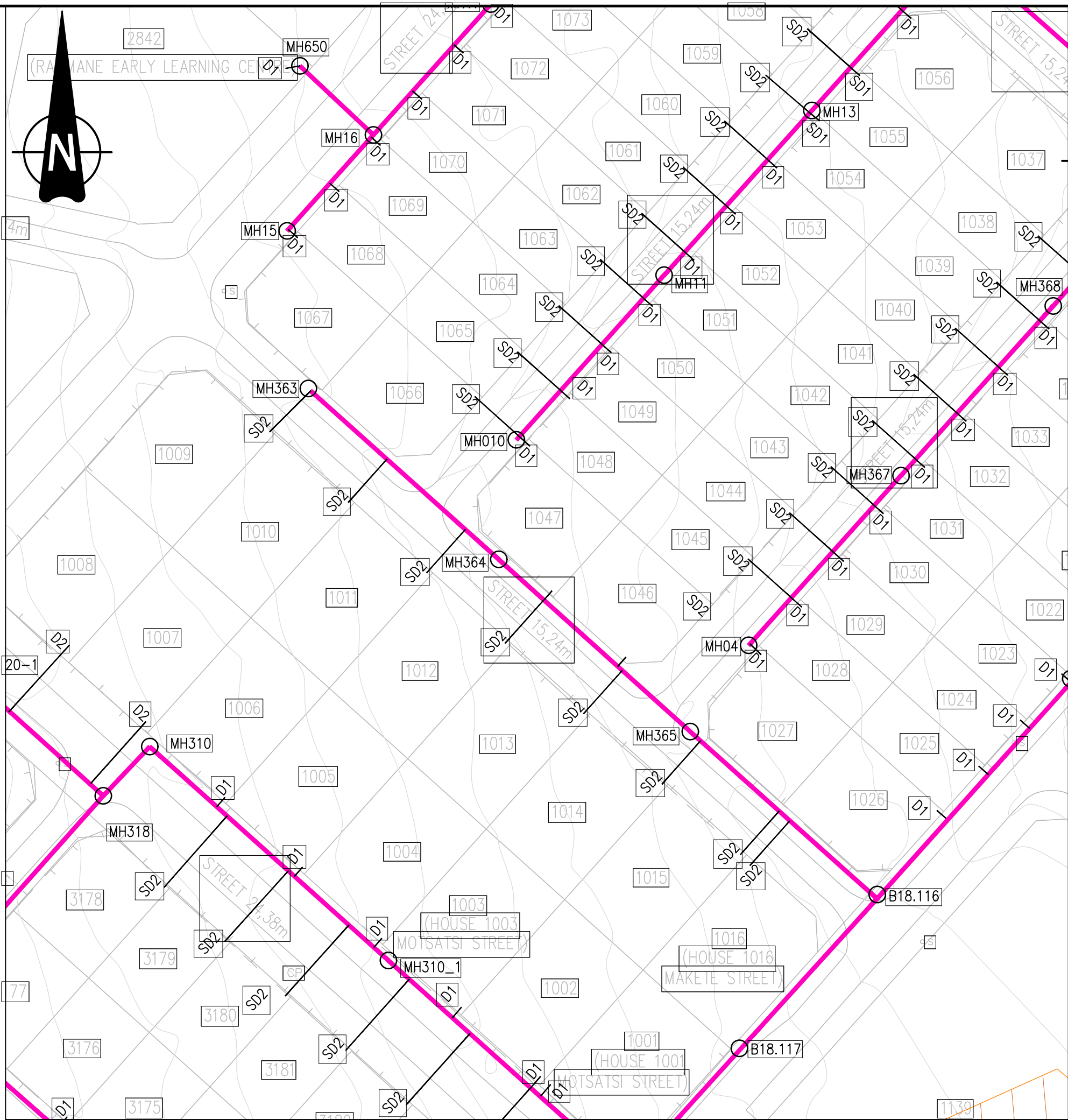
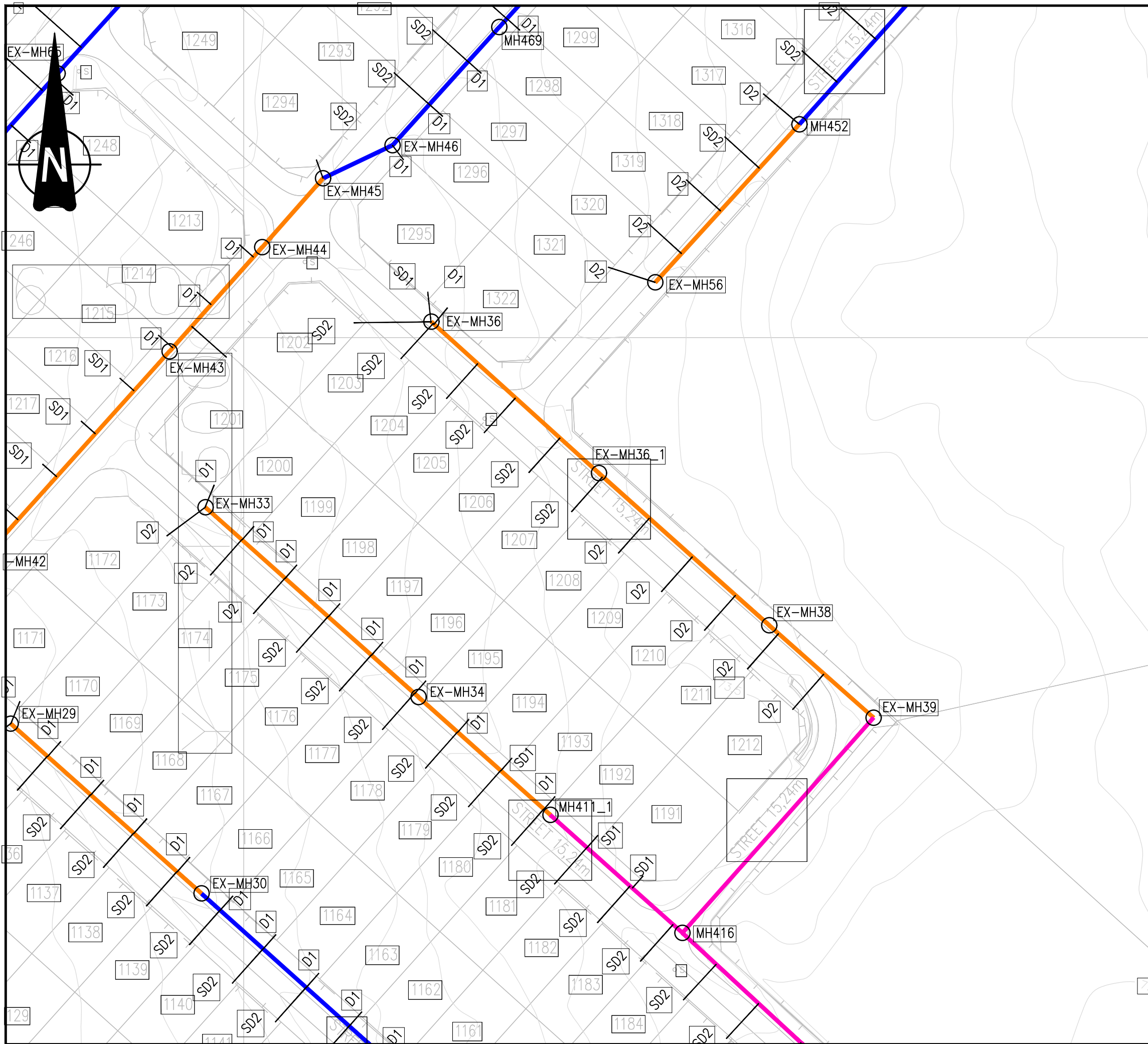


Chainage		168.804	4.143
Ground Level		168.954	0.000
Manhole Name	MH495	168.804	4.143
Inlet Level / Outlet Level		167.549	168.71825,000_1
Link Type / Link Size	PVCU	140 mm	
Length / Slope	4.224m	19.914%	
Flow	0.000 m ³ /s		
Capacity	0.080 m ³ /s		
Velocity	1.402 m/s		
Hydraulic Elevation	167.652	168.821	

DRAWING No.			
LSO-228-SW-LS38			
SHEET	38	of	51
SCALE:		REVISION No:	
1:1000		0	

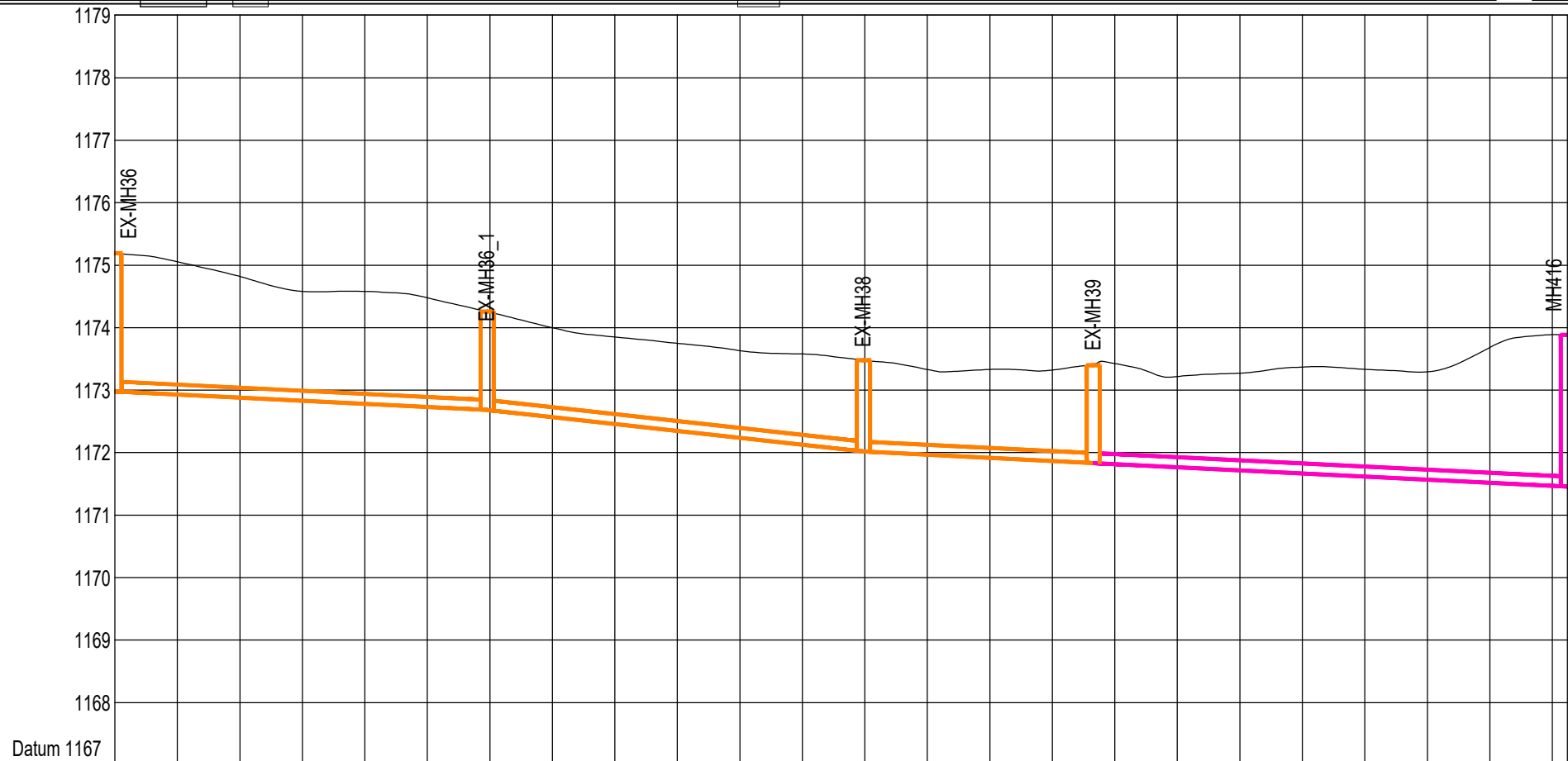


RECORD OF CONSTRUCTION				[DEPARTMENT]	[APPROVED]	[DESIGNATION]	[DATE]	[DESIGNED]	[M.M]	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT	Rustenburg Local Municipality  P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607	[ISSUED FOR APPROVAL (Full signature)]	[DRAWING No.] LSO-228-SW-LS39
[No.]	[REVISIONS]	[CHK'D]	[DATE]										[DESIGN CHECKED]	[K.M]
[01]	[ISSUED FOR TENDER]	[K.M]	[05-2024]											
											</			



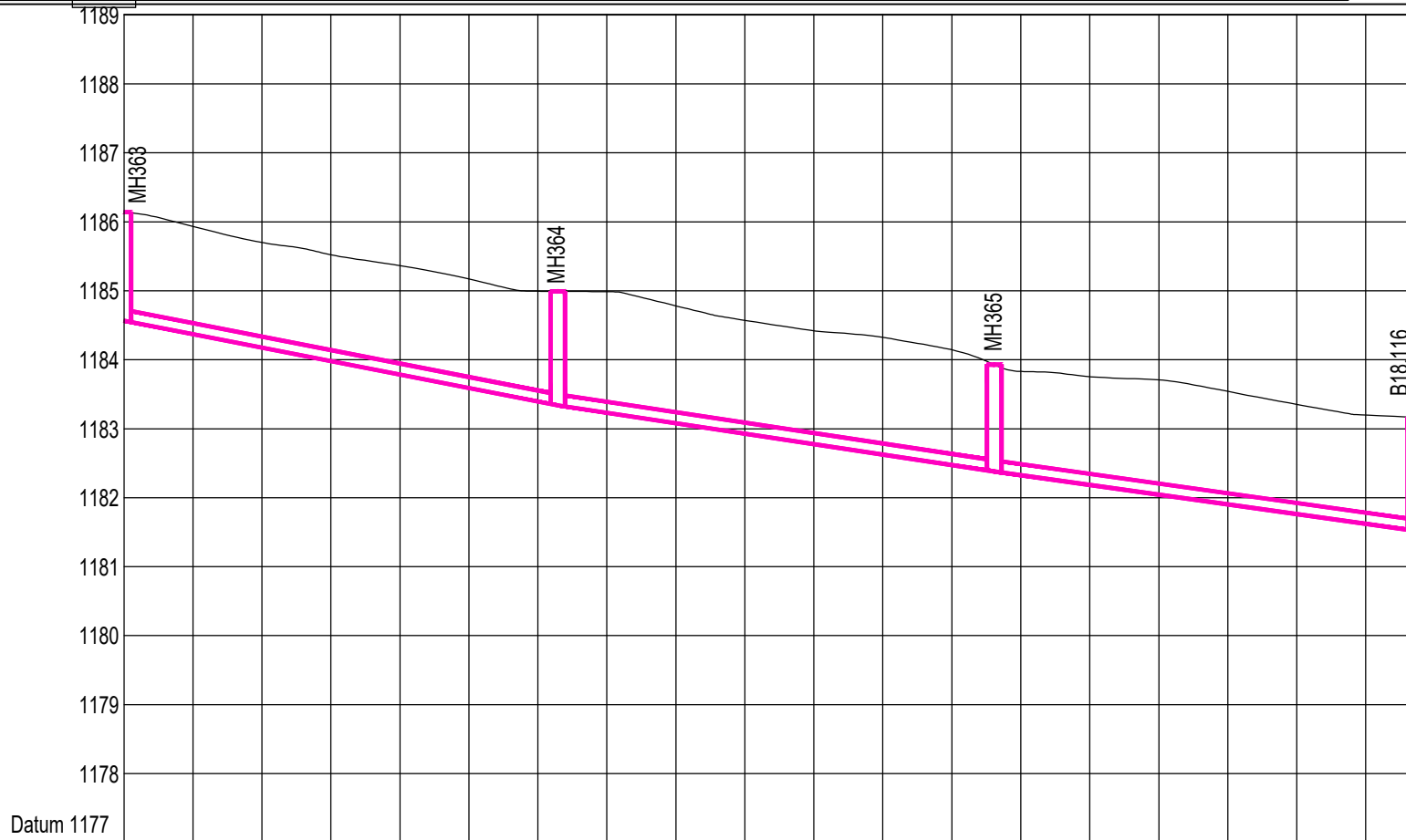
- NOTES:**
- ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 - MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 - FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 - HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 - ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 - ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:	
	FUTURE / LINK SEWER
	EXISTING SEWER PIPELINE
	REBUILD PIPELINE & MH
	NEW PIPELINE
	PHASE 2- NOT INCLUDED IN THIS CONTRACT



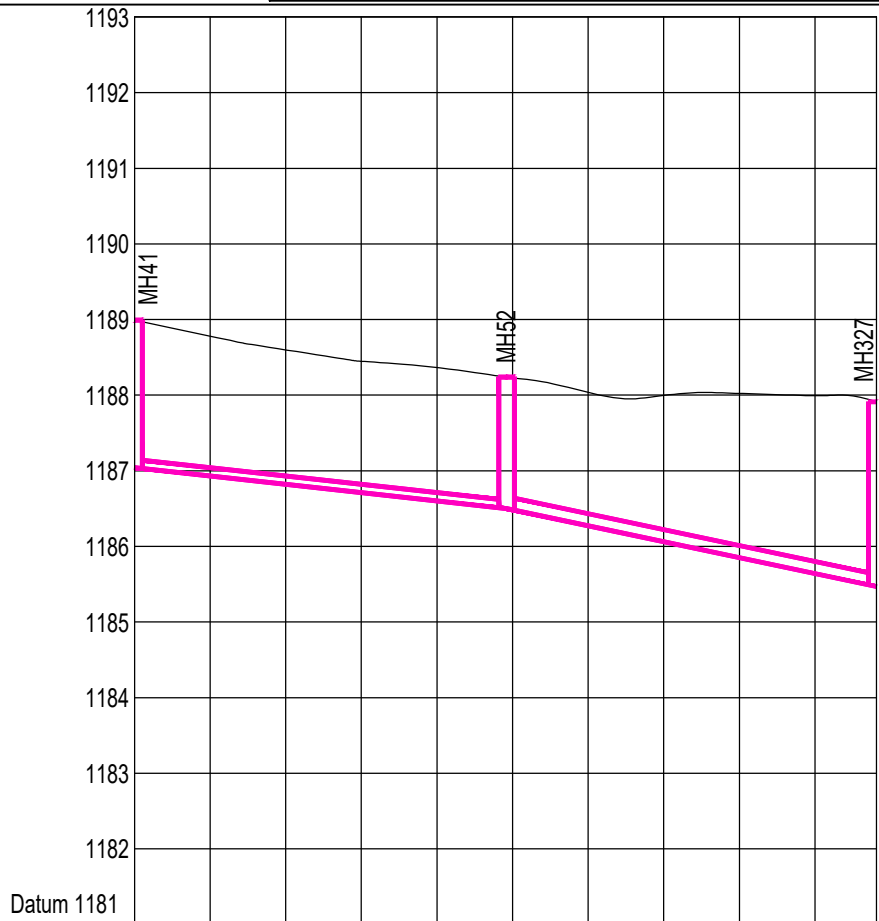
Chainage	0.000	117.468	117.468	117.468	117.468
Ground Level	1172.862	1172.862	1172.862	1172.862	1172.862
Manhole Name	EX-MH36	EX-MH36_1	EX-MH36	EX-MH36	MH416
Inlet Level / Outlet Level	1172.862	1172.862	1172.862	1172.862	1172.862
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	59.571 m 0.499%	60.207 m 1.103%	36.768 m 0.500%	75.874 m 0.500%	
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s	
Capacity	0.012 m³/s	0.019 m³/s	0.012 m³/s	0.012 m³/s	
Velocity	0.188 m/s	0.282 m/s	0.206 m/s	0.206 m/s	
Hydraulic Elevation	1172.867	1172.865	1172.865	1172.865	1172.865

MANHOLE EX-MH36 to MH416



Chainage	0.000	118.118	118.118	118.118	118.118
Ground Level	1184.598	1184.598	1184.598	1184.598	1184.598
Manhole Name	MH363	MH363	MH363	MH363	B18.116
Inlet Level / Outlet Level	1184.598	1184.598	1184.598	1184.598	1184.598
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	
Length / Slope	62.894 m 1.951%	63.273 m 1.514%	60.977 m 1.409%		
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s		
Capacity	0.025 m³/s	0.022 m³/s	0.021 m³/s		
Velocity	0.377 m/s	0.331 m/s	0.319 m/s		
Hydraulic Elevation	1184.578	1183.948	1182.392	1181.633	1181.633

MANHOLE MH363 to B18.116



Chainage	0.000	118.118	118.118	118.118	118.118
Ground Level	1187.042	1187.042	1187.042	1187.042	1187.042
Manhole Name	MH41	MH41	MH41	MH41	MH327
Inlet Level / Outlet Level	1187.042	1187.042	1187.042	1187.042	1187.042
Link Type / Link Size	PVC-U 110 mm	PVC-U 160 mm			
Length / Slope	49.224 m 1.095%	48.923 m 2.108%			
Flow	0.000 m³/s	0.000 m³/s			
Capacity	0.007 m³/s	0.026 m³/s			
Velocity	0.220 m/s	0.391 m/s			
Hydraulic Elevation	1187.048	1186.514	1185.472	1184.472	1183.472

MANHOLE MH41 to MH327

RECORD OF CONSTRUCTION			
No.	REVISIONS	CHK'D	DATE
01	ISSUED FOR TENDER	K.M.	05-2024

DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M.
				DESIGN CHECKED	K.M.
				DRAWN	M.M.
				DRAWING CHECKED	K.M.

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
PHASE2
SEWER LONGSECTION 40
MANHOLE EX-MH36 to MH416 ; MH363 to B18.116 & MH41 to MH327



P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT

DATE

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ENGINEER

DATE

DRAWING No.

LSO-228-SW-LS40

SHEET

40

of

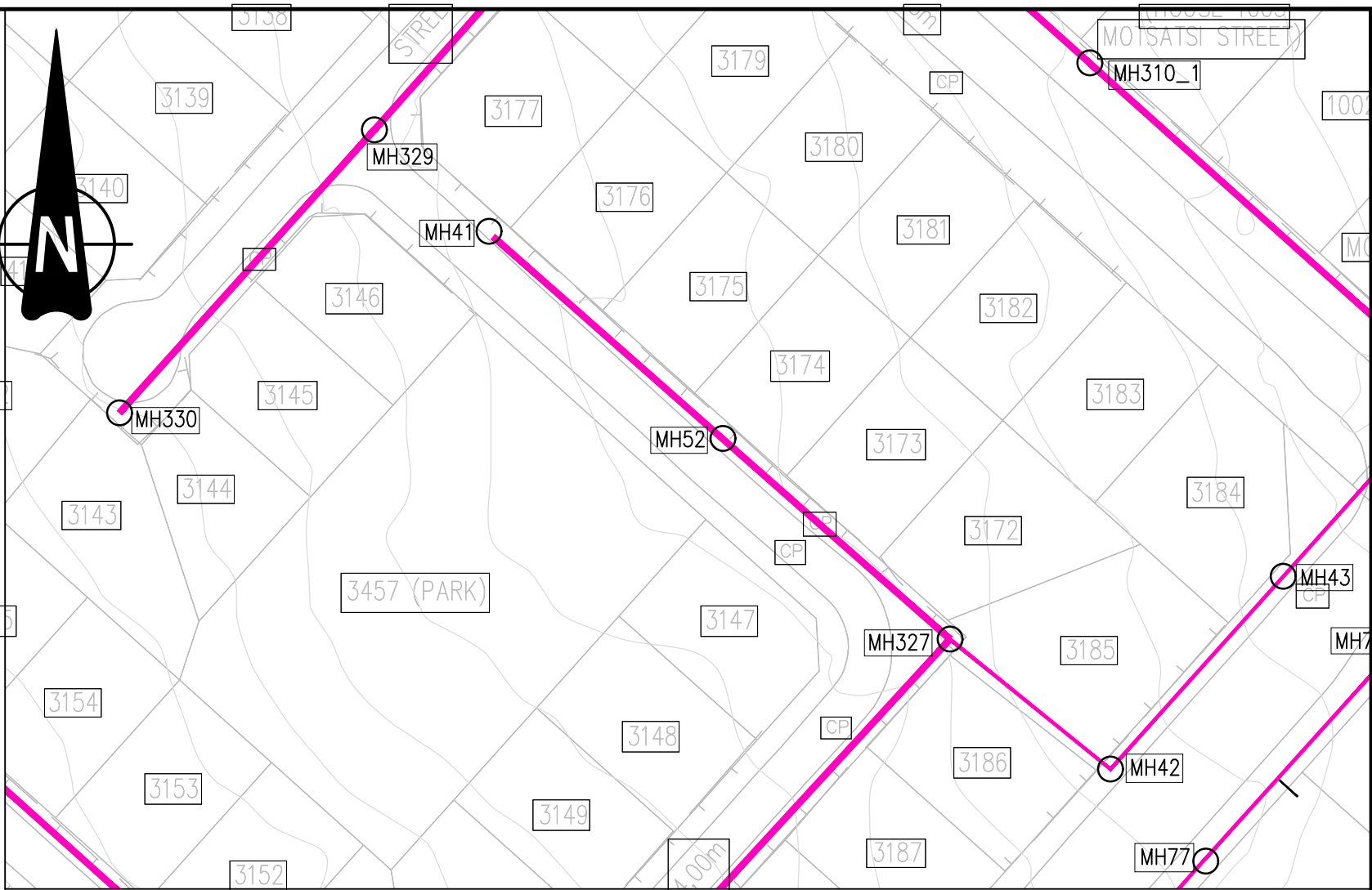
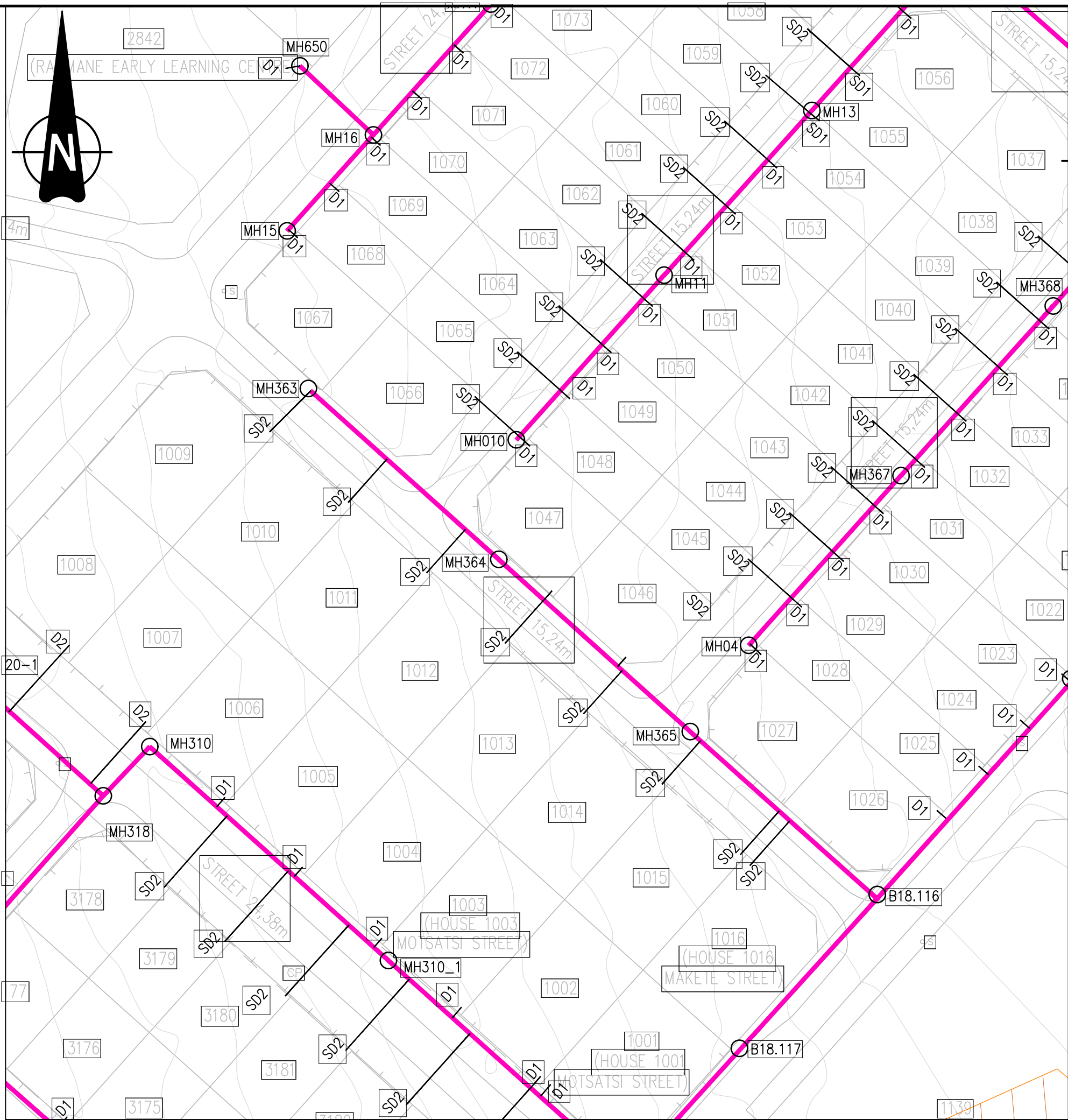
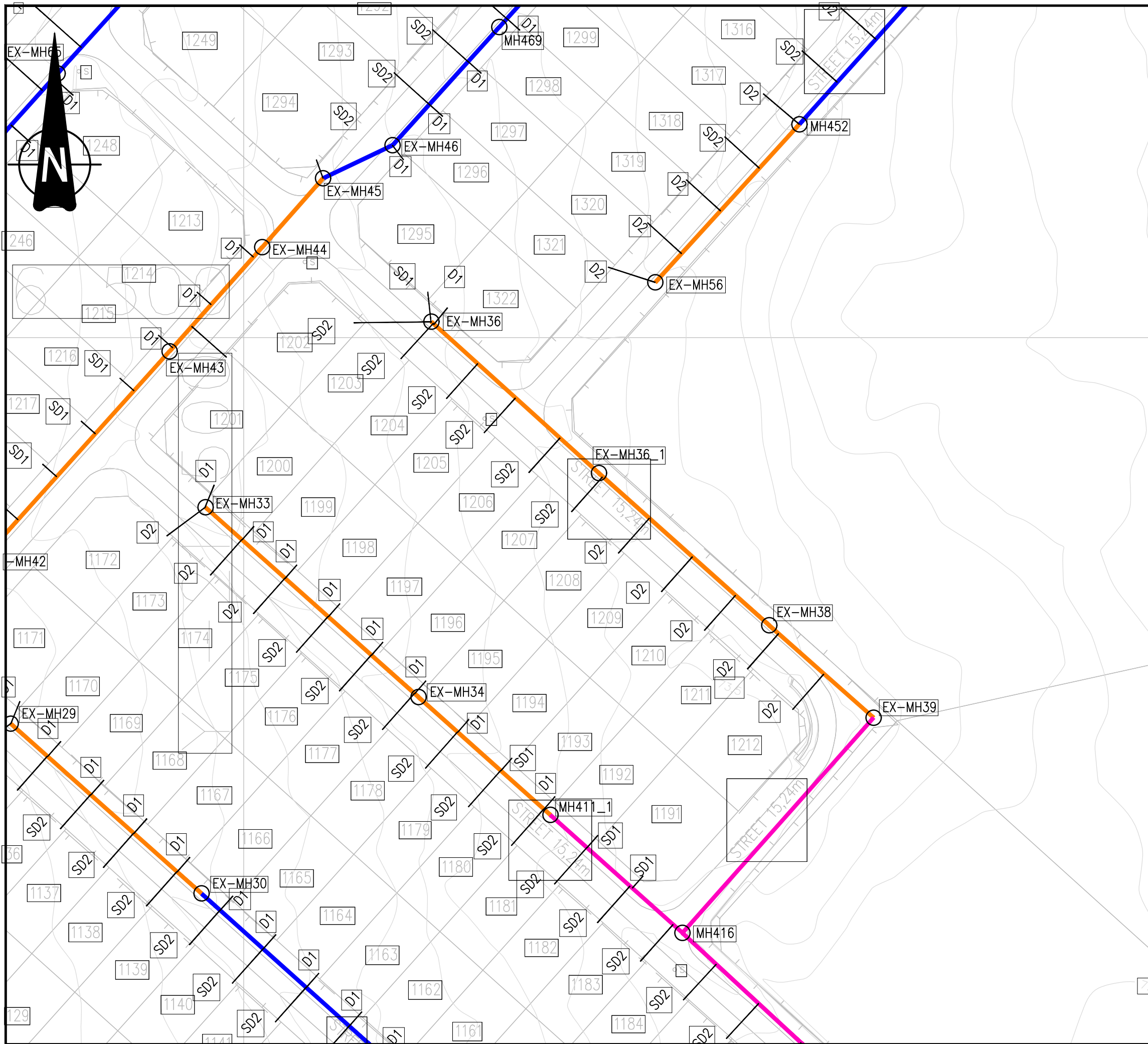
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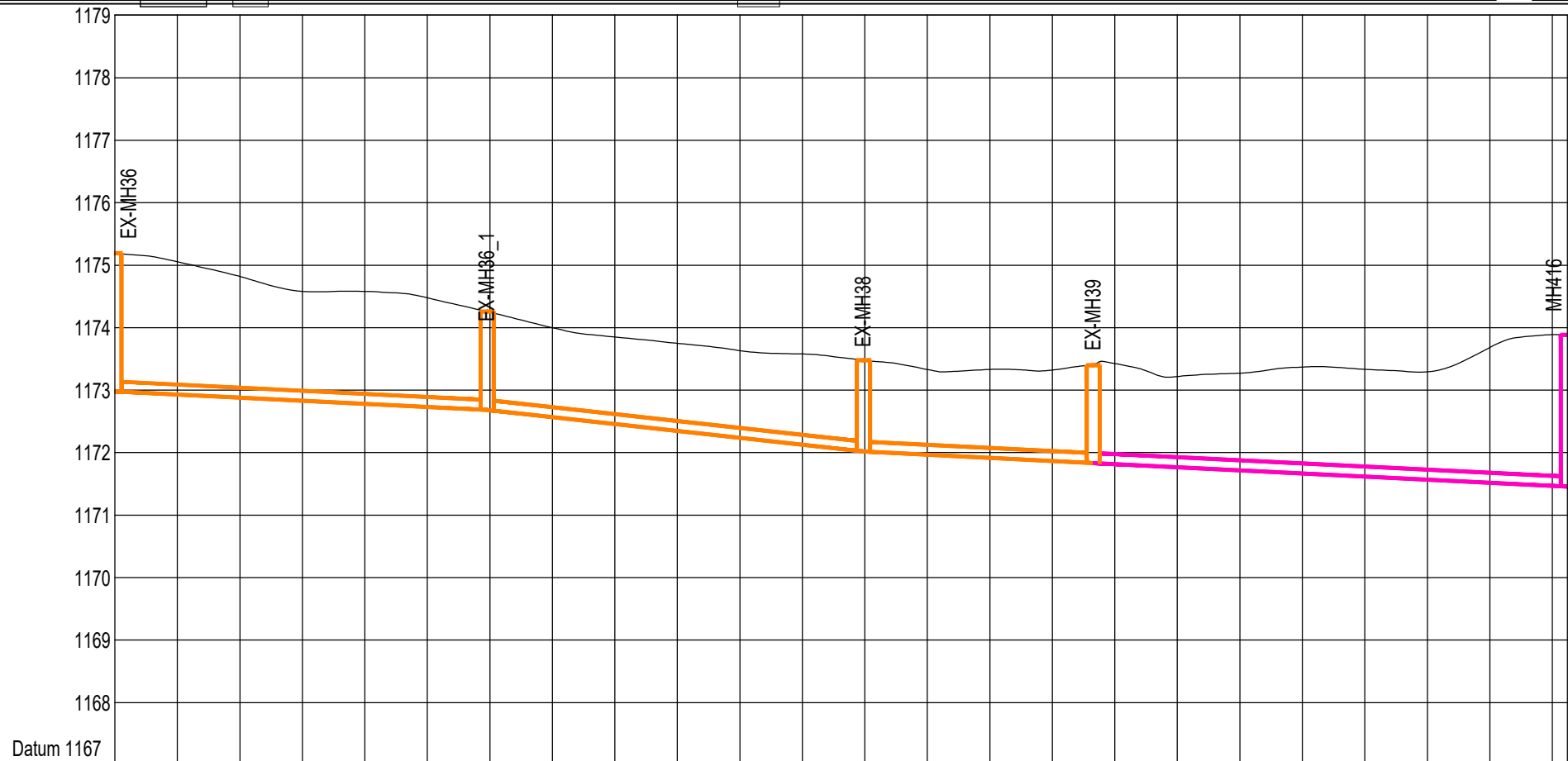
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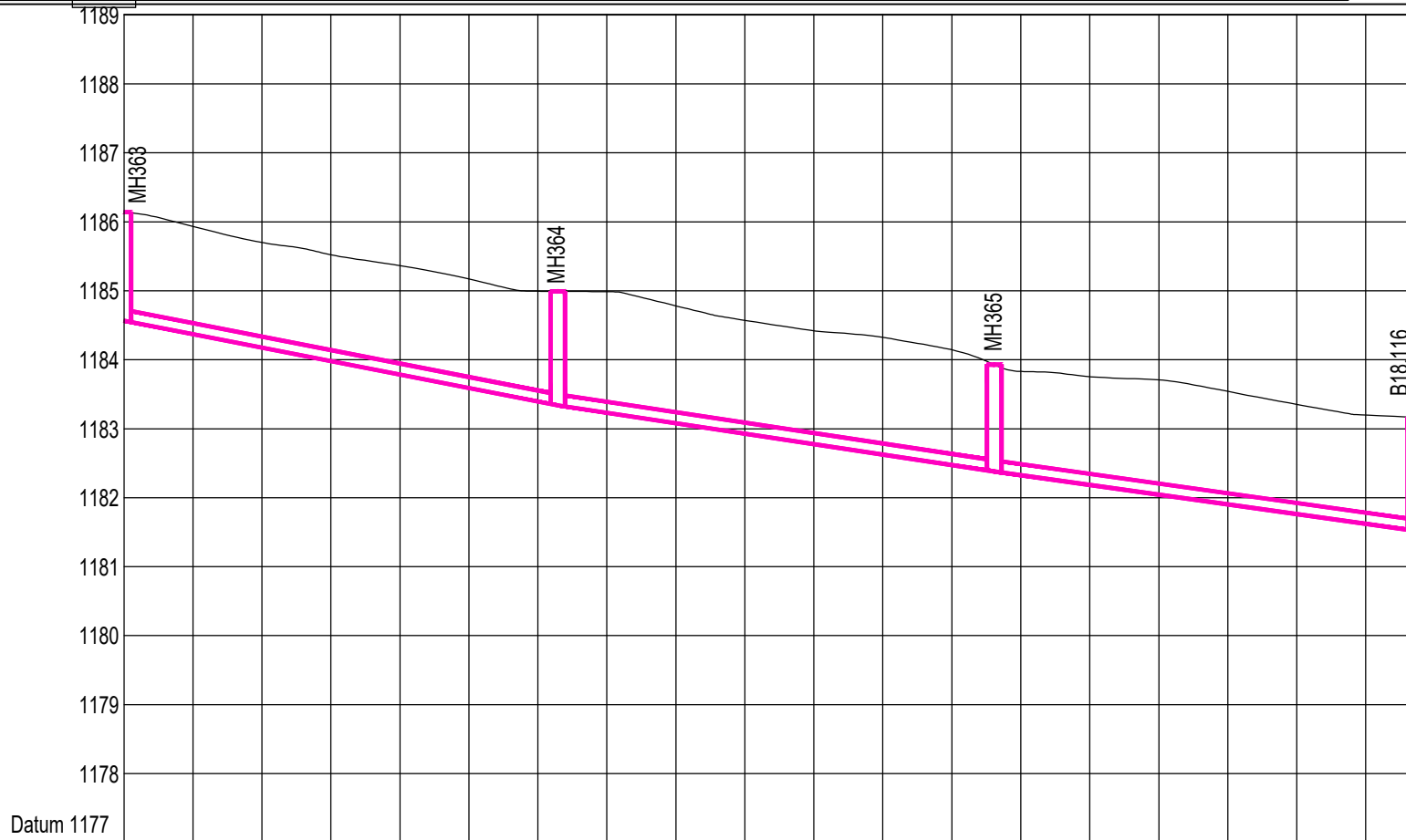
- NOTES:**
1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
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 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:	
	FUTURE / LINK SEWER
	EXISTING SEWER PIPELINE
	REBUILD PIPELINE & MH
	NEW PIPELINE
	PHASE 2- NOT INCLUDED IN THIS CONTRACT



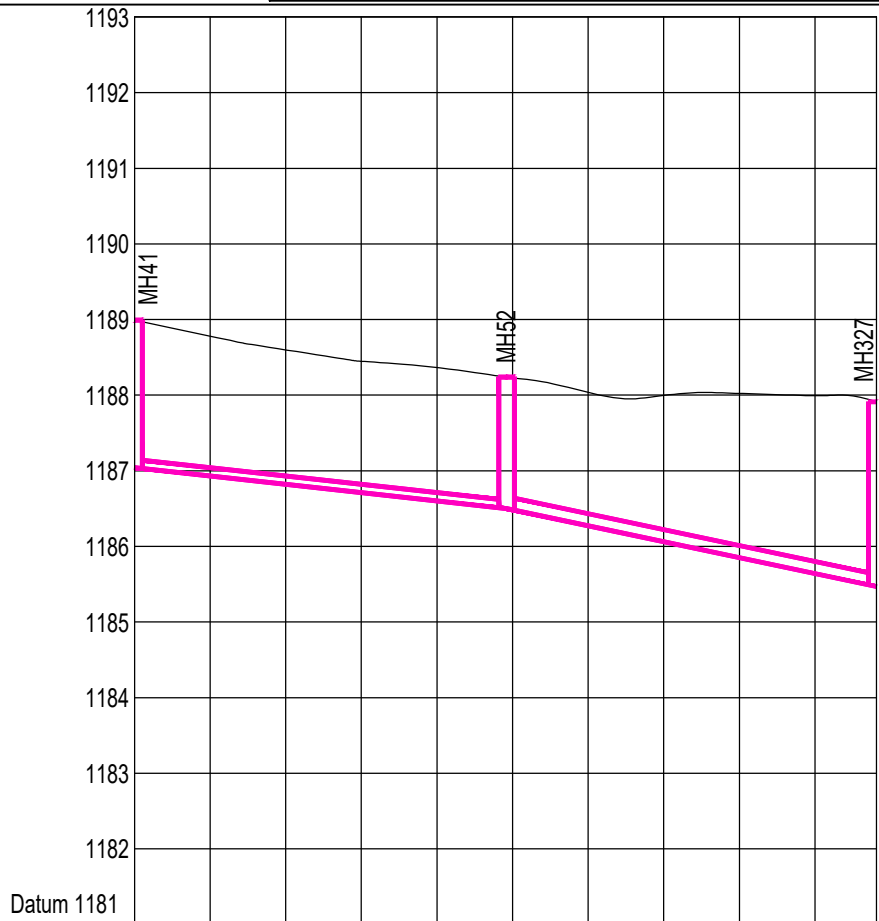
Chainage	0.000	117.468	117.468	117.468
Ground Level	1172.862	1172.862	1172.862	1172.862
Manhole Name	EX-MH36	EX-MH36_1	EX-MH36	EX-MH36
Inlet Level / Outlet Level	1172.862	1172.862	1172.862	1172.862
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	59.571 m 0.499%	60.207 m 1.103%	36.768 m 0.500%	75.874 m 0.500%
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s
Capacity	0.012 m³/s	0.019 m³/s	0.012 m³/s	0.012 m³/s
Velocity	0.188 m/s	0.282 m/s	0.206 m/s	0.206 m/s
Hydraulic Elevation	1172.867	1172.865	1172.865	1172.865

MANHOLE EX-MH36 to MH416



Chainage	0.000	118.118	118.118	118.118
Ground Level	1184.568	1184.568	1184.568	1184.568
Manhole Name	MH363	MH363	MH363	MH363
Inlet Level / Outlet Level	1184.568	1184.568	1184.568	1184.568
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	62.894 m 1.951%	63.273 m 1.514%	60.977 m 1.409%	
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	
Capacity	0.025 m³/s	0.022 m³/s	0.021 m³/s	
Velocity	0.377 m/s	0.331 m/s	0.319 m/s	
Hydraulic Elevation	1184.578	1183.945	1182.392	1181.633

MANHOLE MH363 to B18.116



Chainage	0.000	118.118	118.118	118.118
Ground Level	1187.042	1187.042	1187.042	1187.042
Manhole Name	MH41	MH41	MH41	MH41
Inlet Level / Outlet Level	1187.042	1187.042	1187.042	1187.042
Link Type / Link Size	PVC-U 110 mm	PVC-U 160 mm	PVC-U 160 mm	
Length / Slope	49.224 m 1.095%	48.923 m 2.108%		
Flow	0.000 m³/s	0.000 m³/s		
Capacity	0.007 m³/s	0.026 m³/s		
Velocity	0.220 m/s	0.391 m/s		
Hydraulic Elevation	1187.048	1186.514	1185.463	

MANHOLE MH41 to MH327

RECORD OF CONSTRUCTION			
No.	REVISIONS	CHK'D	DATE
01	ISSUED FOR TENDER	K.M.	05-2024

DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M.
				DESIGN CHECKED	K.M.
				DRAWN	M.M.
				DRAWING CHECKED	K.M.

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:

TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:

PHASE2
SEWER LONGSECTION 40
MANHOLE EX-MH36 to MH416 ; MH363 to B18.116 & MH41 to MH327



P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT

DATE

Handwritten signature

ENGINEER

DATE

DRAWING No.

LSO-228-SW-LS40

SHEET

40

of

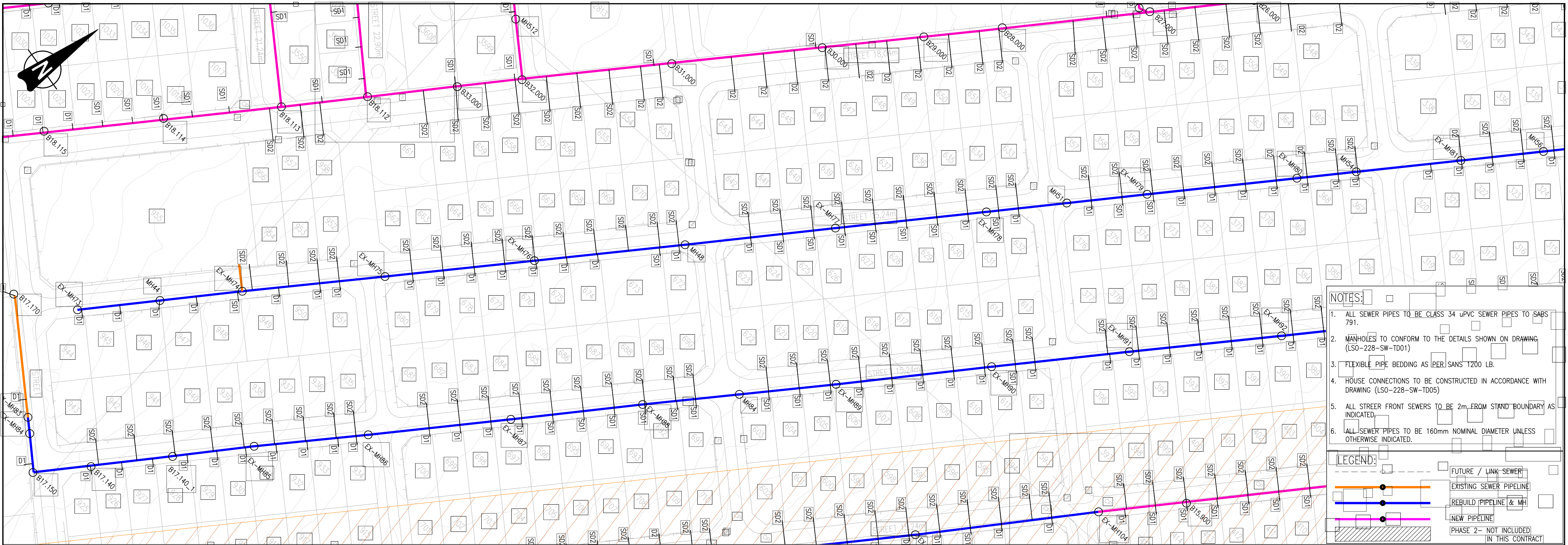
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REVISION No.

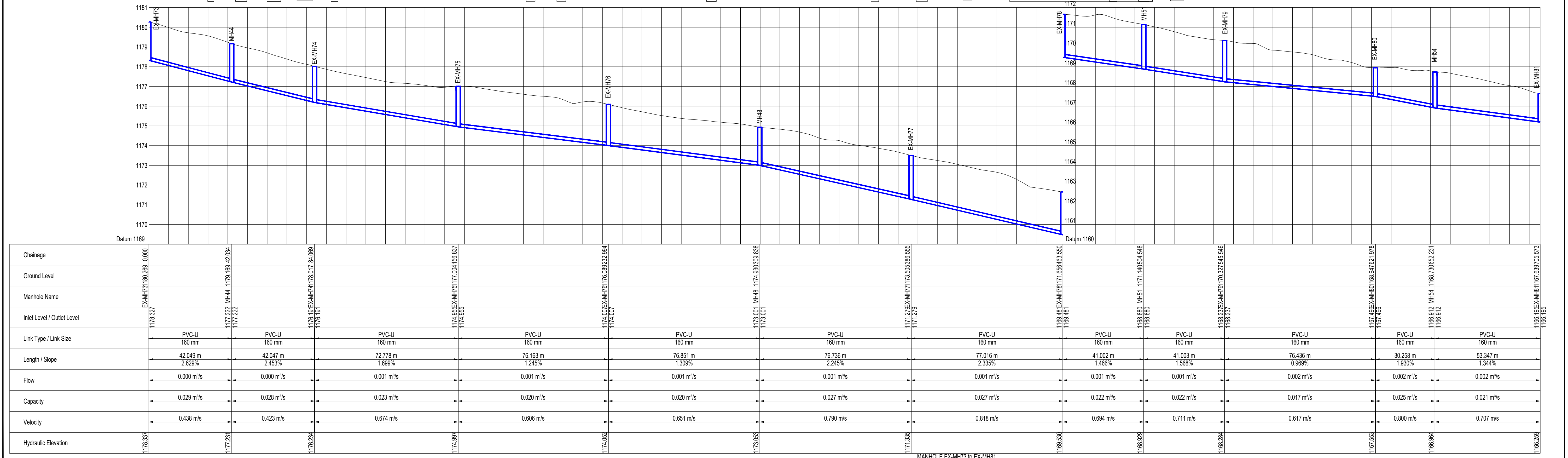
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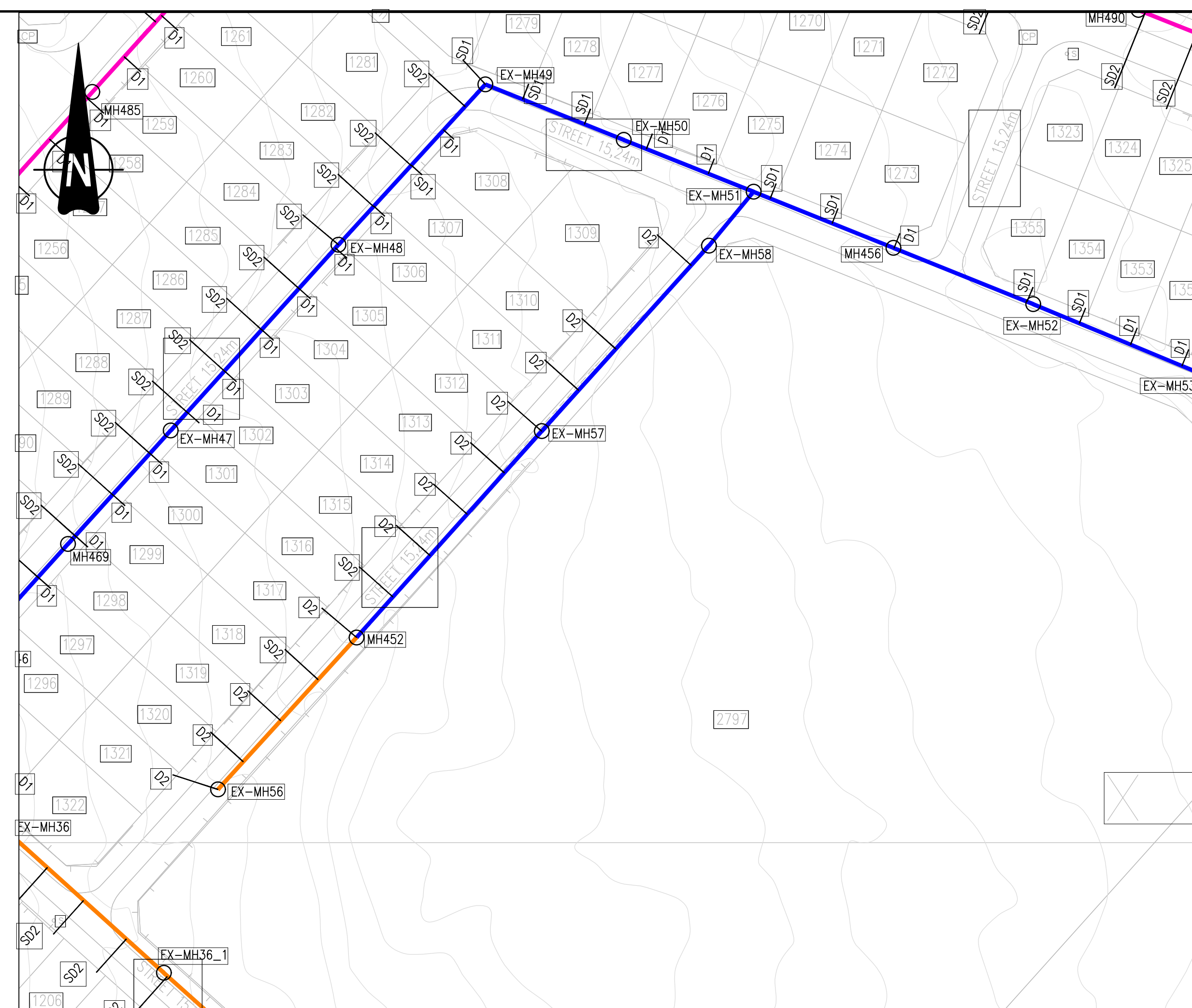
- NOTES:
1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREEER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

- FUTURE / LINK SEWER
- EXISTING SEWER PIPELINE
- REBUILD PIPELINE & MH
- NEW PIPELINE
- PHASE 2- NOT INCLUDED IN THIS CONTRACT

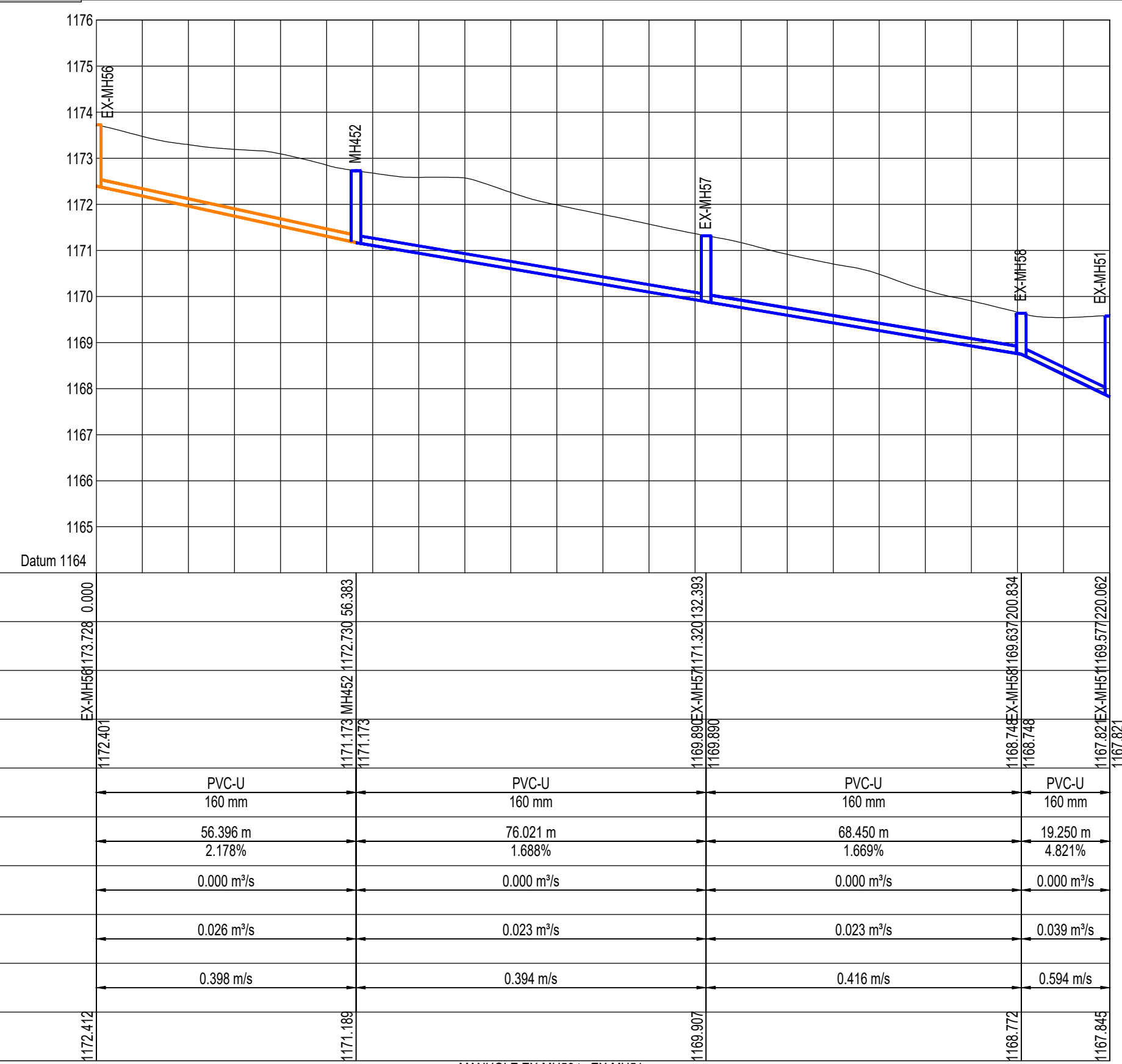
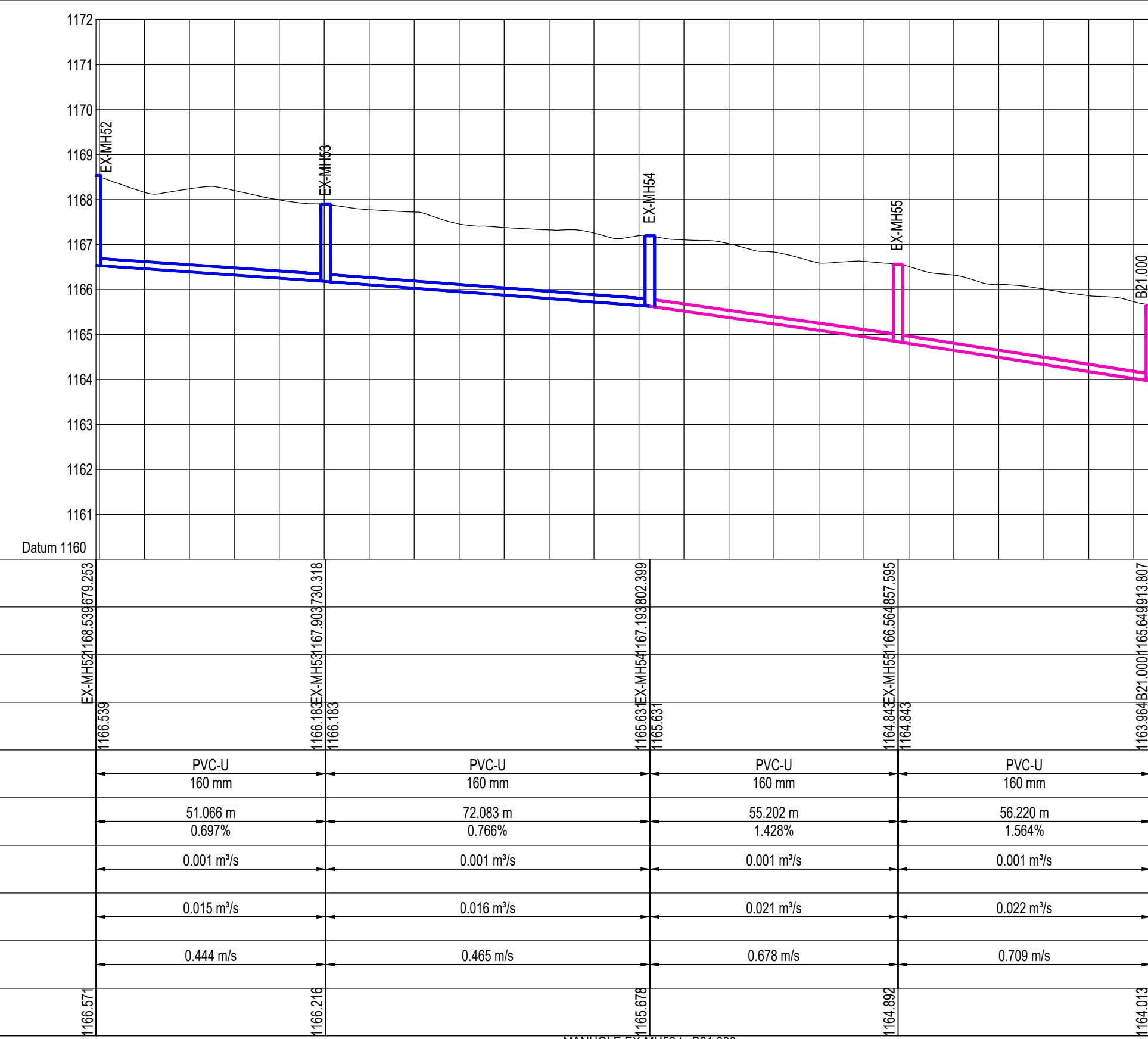
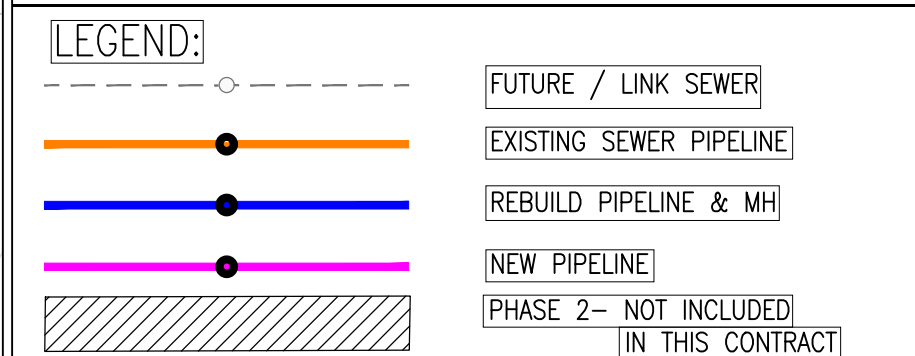


RECORD OF CONSTRUCTION				[DEPARTMENT]	[APPROVED]	[DESIGNATION]	[DATE]	[DESIGNED]	[M.M.]		PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT	DRAWING TITLE: PHASE 2 SEWER LONGSECTION 41 MANHOLE EX-MH73 TO EX-MH81		P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607	ISSUED FOR APPROVAL (Full signature) [Signature] ENGINEER	DATE 05-2024	DRAWING No. LSO-228-SW-LS41	[SHEET] 41 of 51	SCALE: 1:1000	REVISION No: 0
No.	REVISIONS	CHK'D	DATE																	
01	ISSUED FOR TENDER	K.M.	05-2024																	

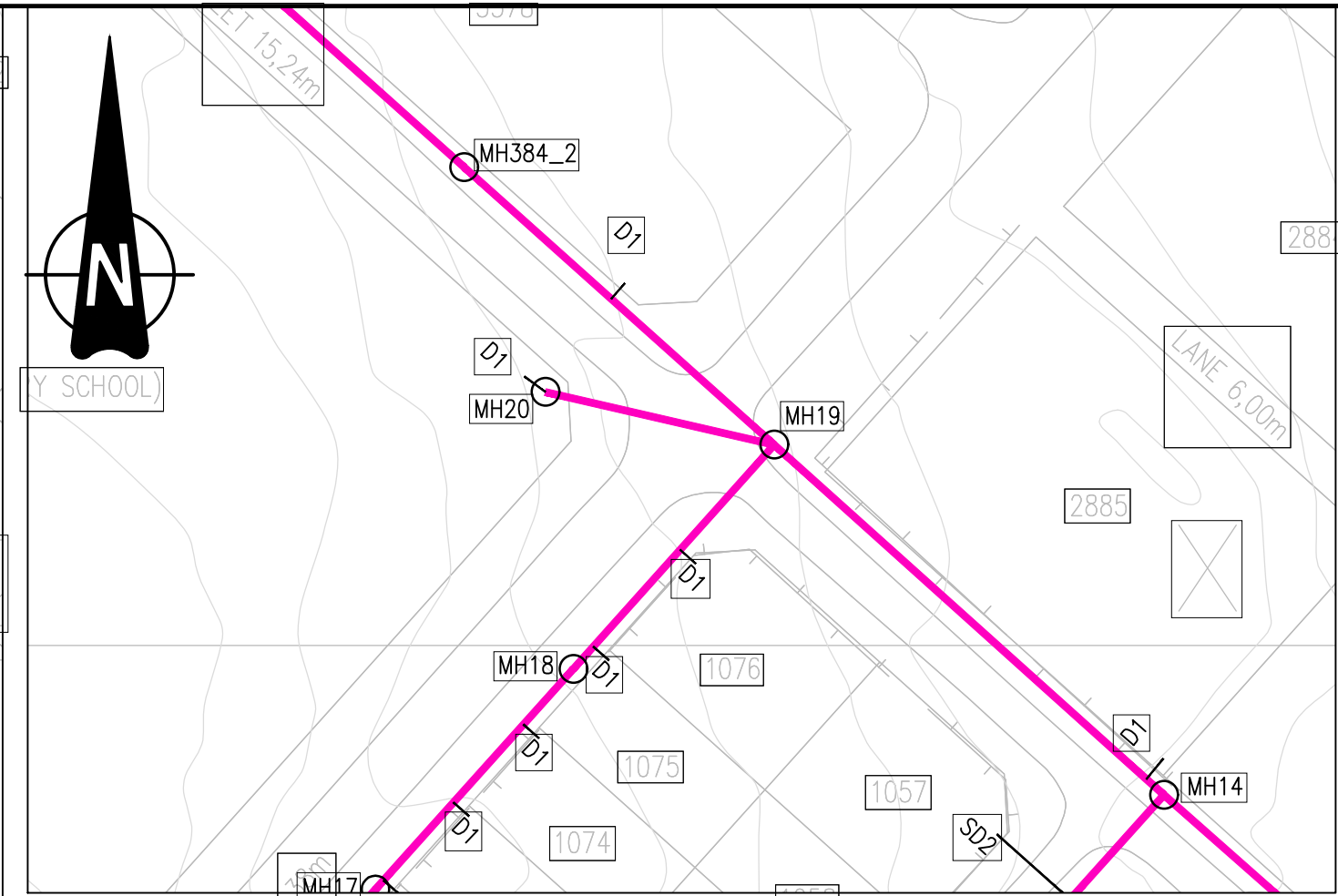
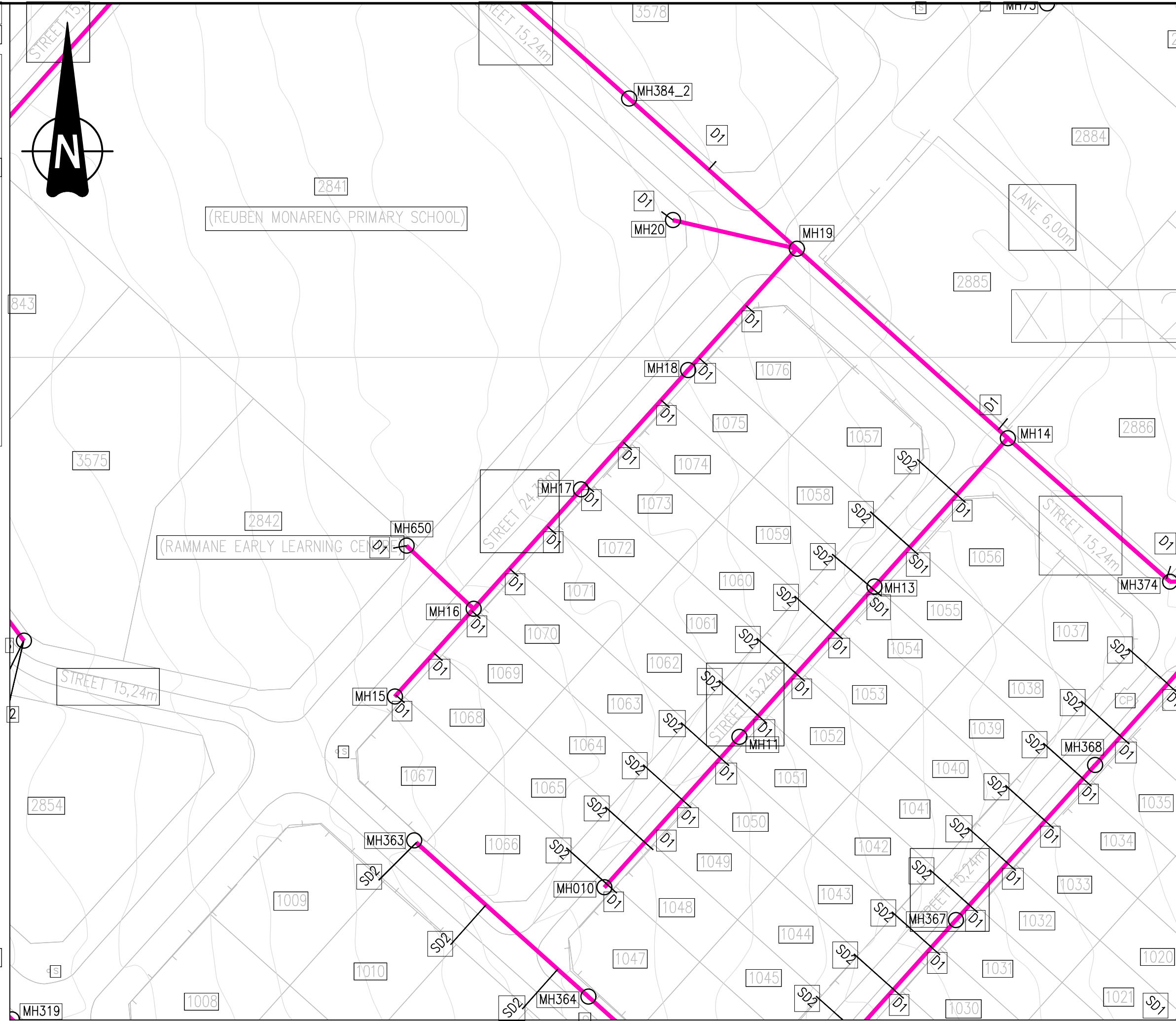
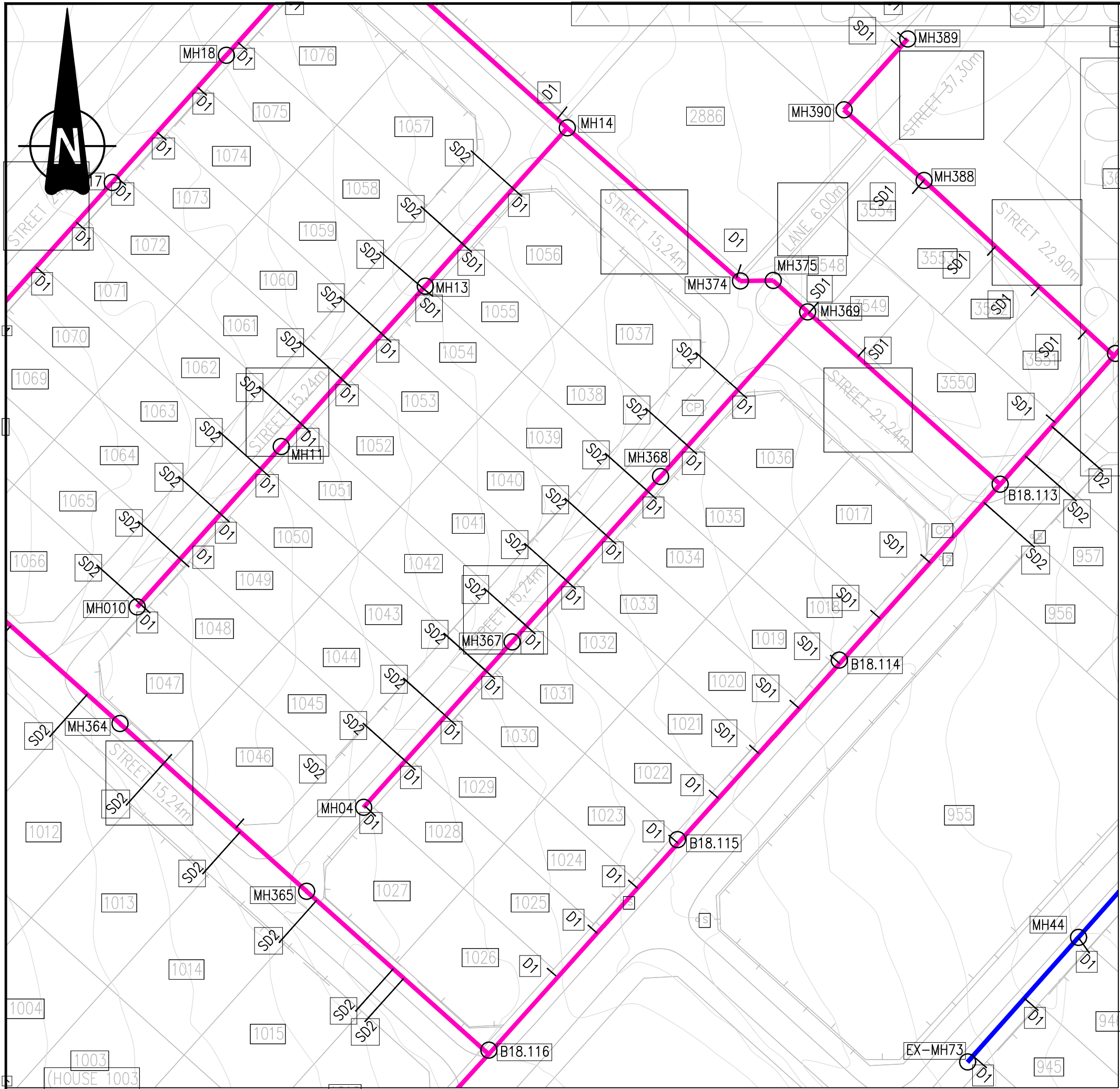


- NOTES:**

 1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 2. MAN-HOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.



RECORD OF CONSTRUCTION				MANHOLE EX-MH52 to B21.000		PROJECT TITLE:		MANHOLE EX-MH56 to EX-MH51		ISSUED FOR APPROVAL (Full signature)		DRAWING No.	
No.	REVISIONS	CHK'D	DATE	DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M.	P.O. Box 16 Rustenburg 0300		LSO-228-SW-LS42	
0	ISSUED FOR TENDER	K.M.	05-2024					DESIGN CHECKED	K.M.	Tel: 014 590 3607		SHEET 42 of 51	
								DRAWN	M.M.	ENGINEER		SCALE: 1:1000	
								DRAWING CHECKED	K.M.	ENGINEER		REVISION No: 0	
												</	

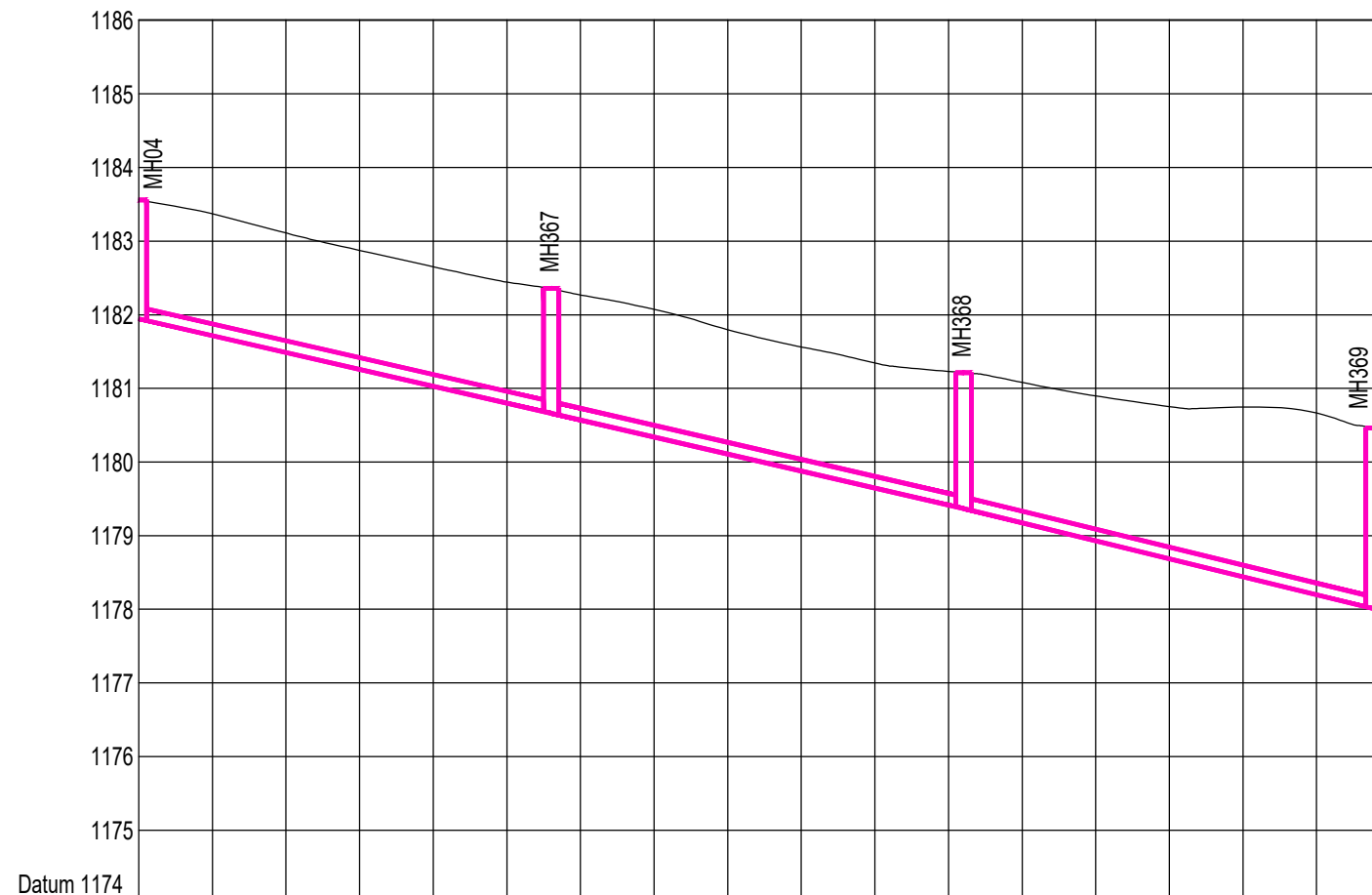


NOTES:

1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
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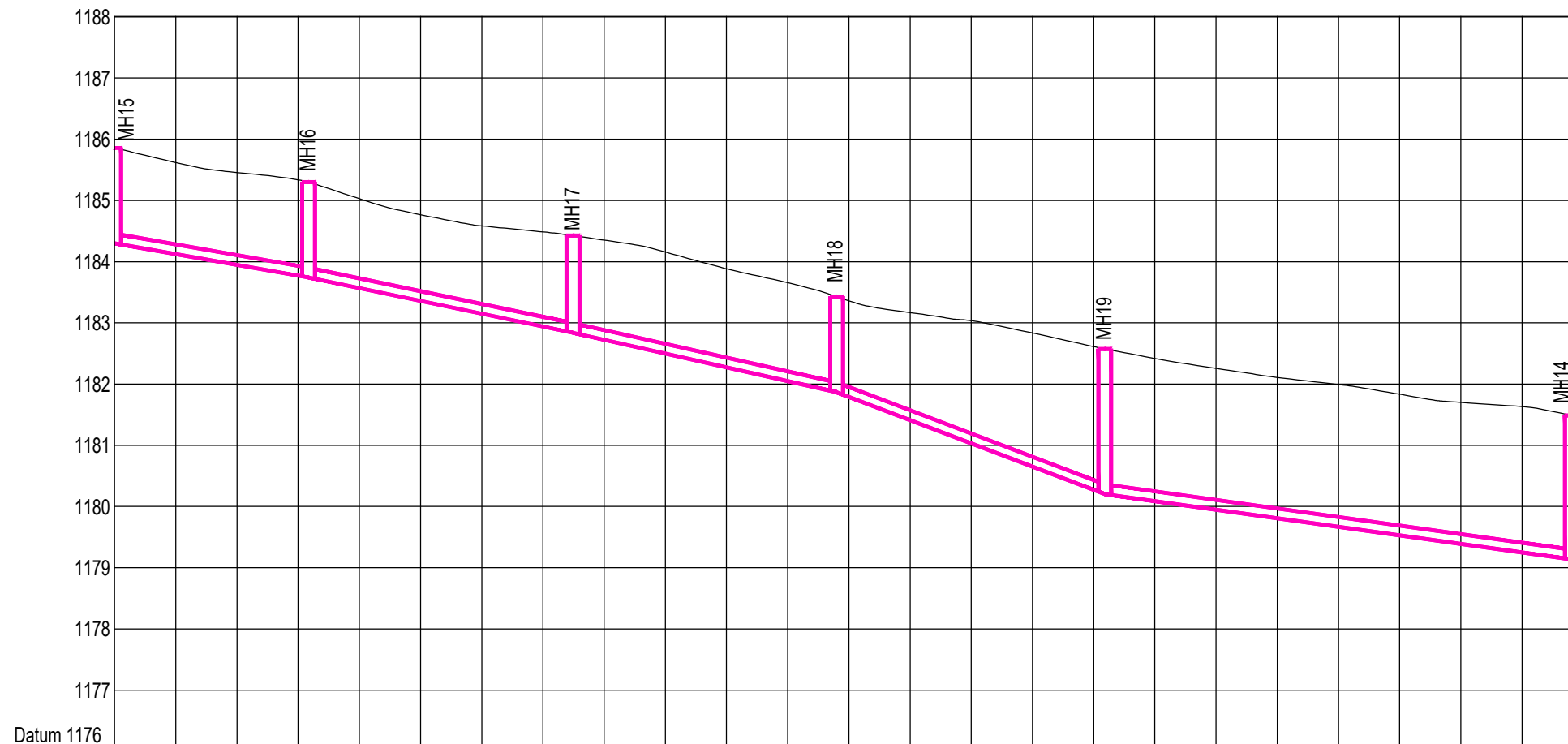
LEGEND:

- | | |
|--|--|
| | FUTURE / LINK SEWER |
| | EXISTING SEWER PIPELINE |
| | REBUILD PIPELINE & MH |
| | NEW PIPELINE |
| | PHASE 2- NOT INCLUDED IN THIS CONTRACT |



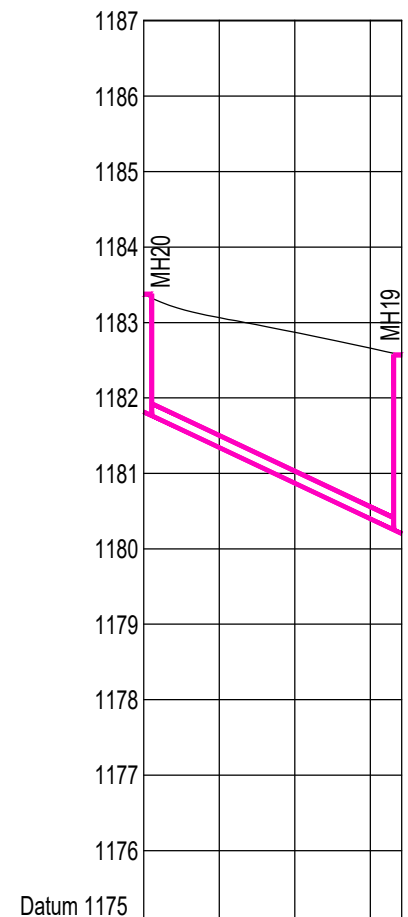
Chainage	MH04 1181.943	MH367 1180.685	MH369 1178.030
Ground Level			
Manhole Name	MH04	MH367	MH369
Inlet Level / Outlet Level	1181.943	1180.685	1178.030
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	56.036 m 2.290%	56.037 m 2.312%	55.705 m 2.440%
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s
Capacity	0.027 m³/s	0.027 m³/s	0.028 m³/s
Velocity	0.408 m/s	0.460 m/s	0.468 m/s
Hydraulic Elevation	1181.943	1180.685	1178.030

MANHOLE MH04 to MH369



Chainage	MH15 1184.305	MH16 1183.744	MH17 1182.840	MH18 1181.871	MH19 1180.205	MH14 1178.139
Ground Level						
Manhole Name	MH15	MH16	MH17	MH18	MH19	MH14
Inlet Level / Outlet Level	1184.305	1183.744	1182.840	1181.871	1180.205	1178.139
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	31.704 m 1.757%	43.218 m 2.092%	43.098 m 2.249%	43.856 m 3.802%	76.254 m 1.398%	34.201 m 4.722%
Flow	0.000 m³/s	0.001 m³/s	0.001 m³/s	0.001 m³/s	0.004 m³/s	0.000 m³/s
Capacity	0.024 m³/s	0.026 m³/s	0.027 m³/s	0.035 m³/s	0.021 m³/s	0.039 m³/s
Velocity	0.357 m/s	0.604 m/s	0.628 m/s	0.777 m/s	0.907 m/s	0.813 m/s
Hydraulic Elevation	1184.305	1183.744	1182.840	1181.871	1180.205	1178.139

MANHOLE MH15 to MH14



Chainage	MH20 1181.818	MH19 1180.249
Ground Level		
Manhole Name	MH20	MH19
Inlet Level / Outlet Level	1181.818	1180.249
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	34.201 m 4.722%	
Flow	0.000 m³/s	
Capacity	0.039 m³/s	
Velocity	0.813 m/s	
Hydraulic Elevation	1181.818	1180.249

Manhole MH20 to MH19

RECORD OF CONSTRUCTION			
No.	REVISIONS	CHK'D	DATE
0	ISSUED FOR TENDER	K.M.	05-2024

DEPARTMENT	APPROVED	DESIGNATION	DATE

DESIGNED	M.M.
DESIGN CHECKED	K.M.
DRAWN	M.M.
DRAWING CHECKED	K.M.



Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:

TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:

PHASE 2
SEWER LONGSECTION 43
MANHOLE MH04 to MH359 ; MH15 to MH14 & MH20 to MH19



P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT

DATE

ENGINEER

DATE

DRAWING No.

LSO-228-SW-LS43

SHEET

43

of

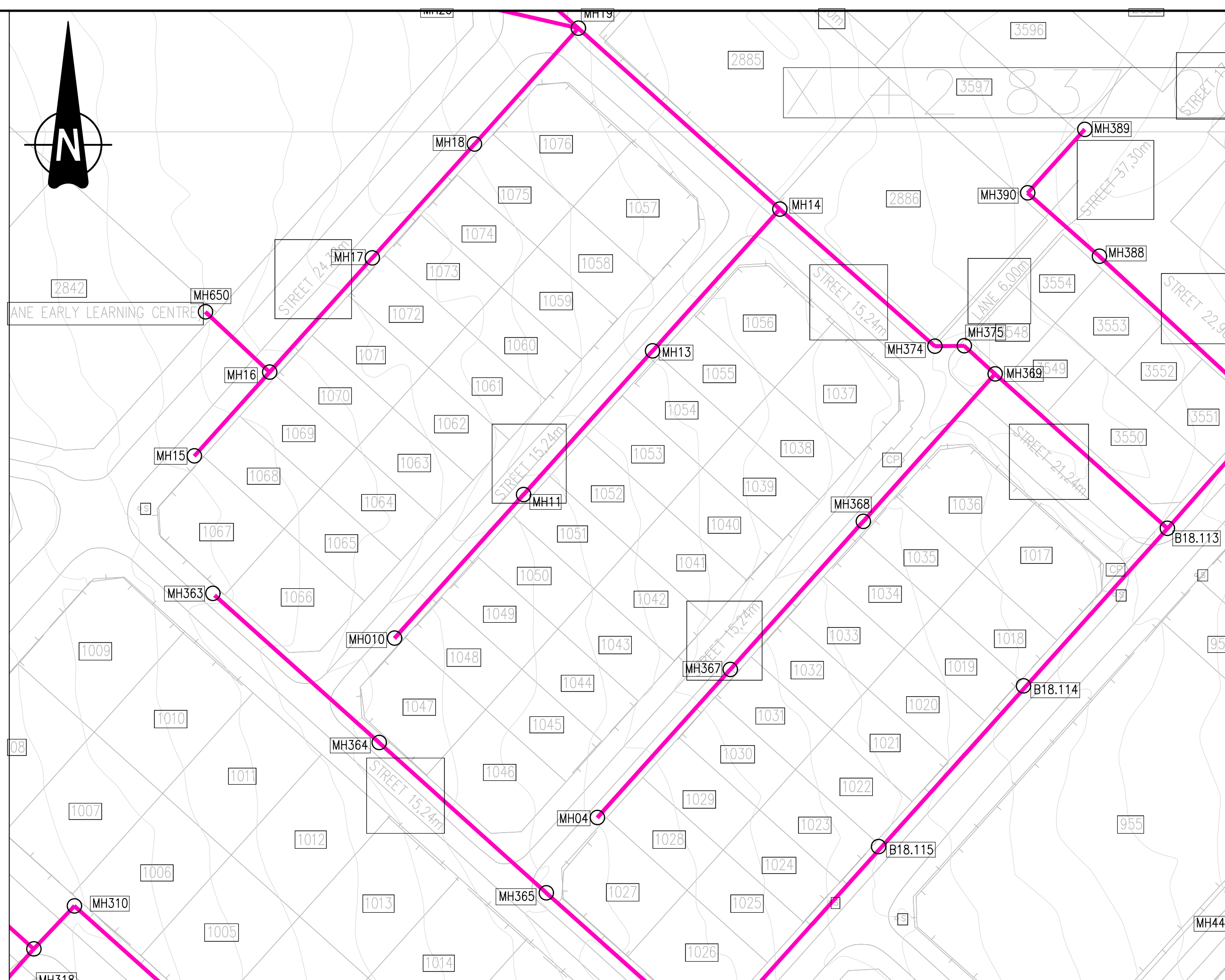
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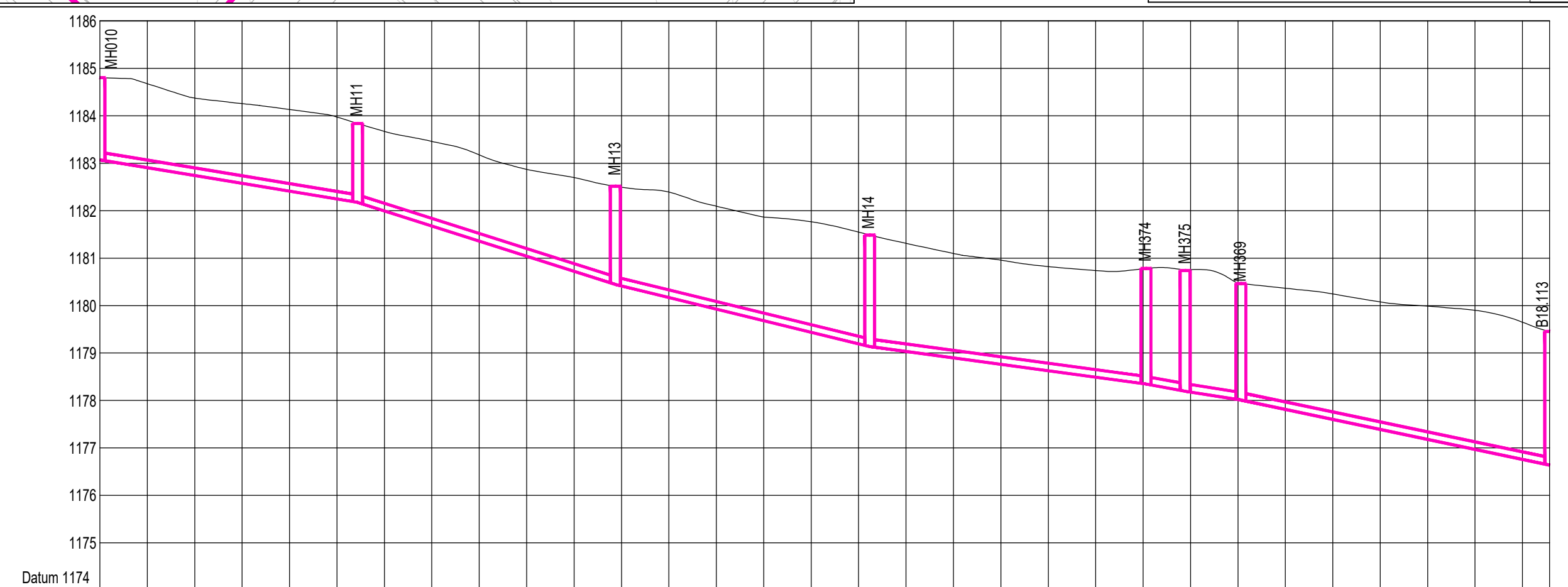
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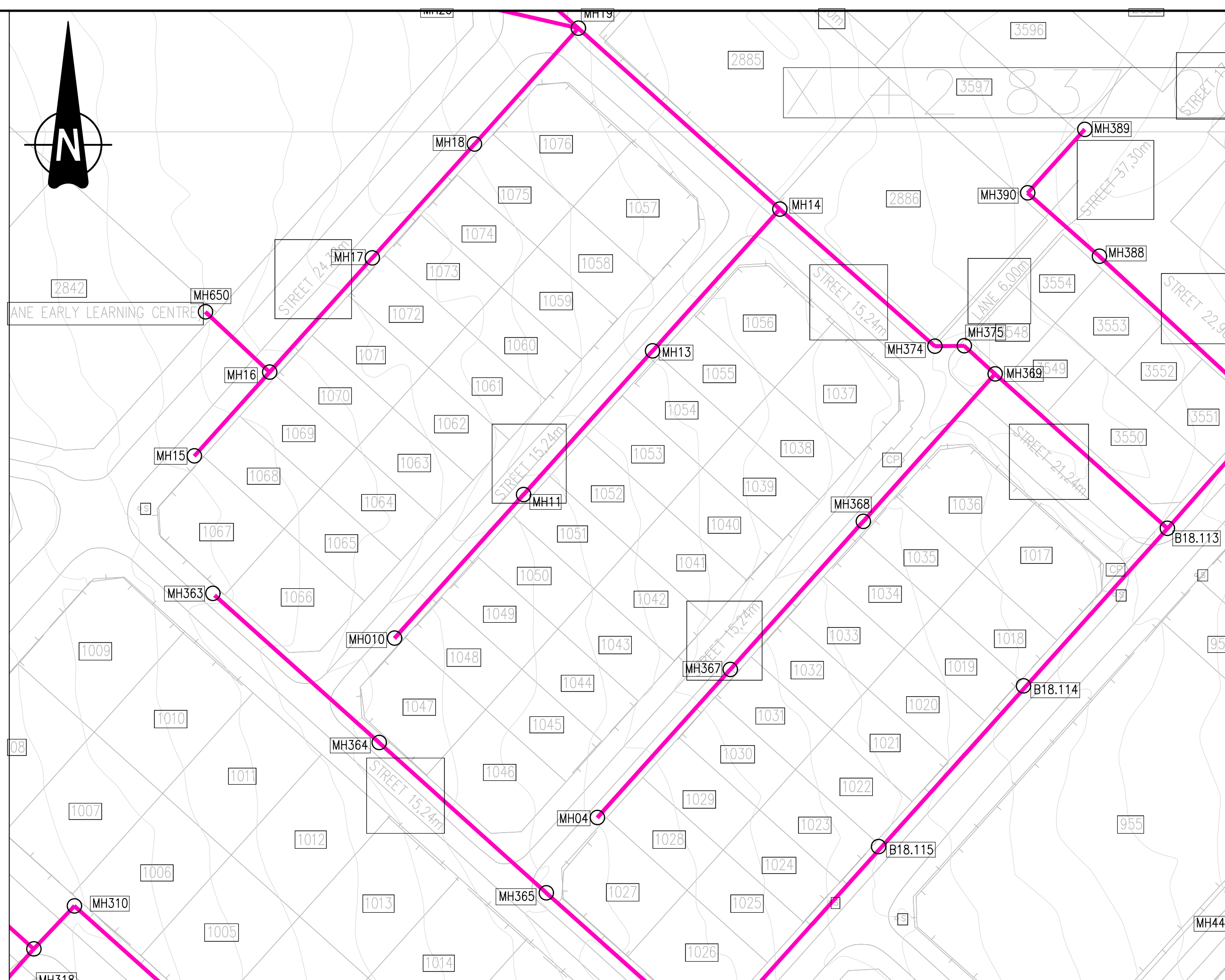
REVISION No.

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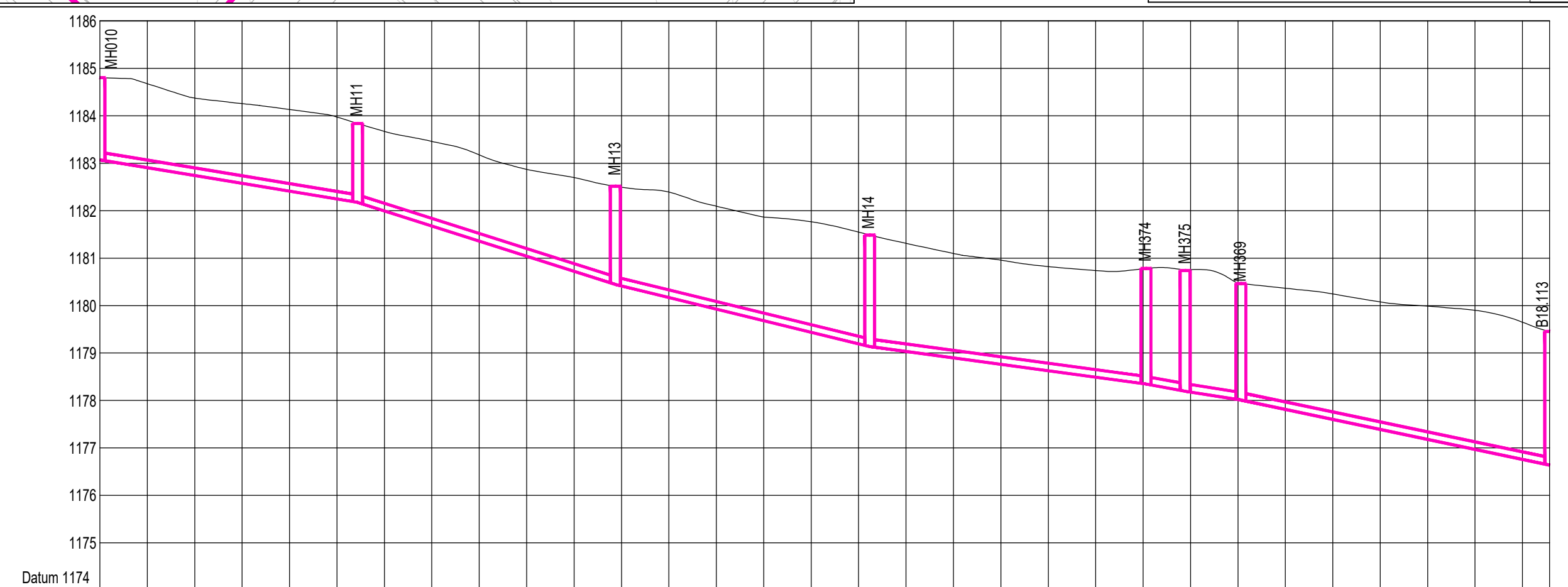


- LEGEND:**
- FUTURE / LINK SEWER
- EXISTING SEWER PIPELINE
- REBUILD PIPELINE & MH
- NEW PIPELINE
- PHASE 2 – NOT INCLUDED
IN THIS CONTRACT

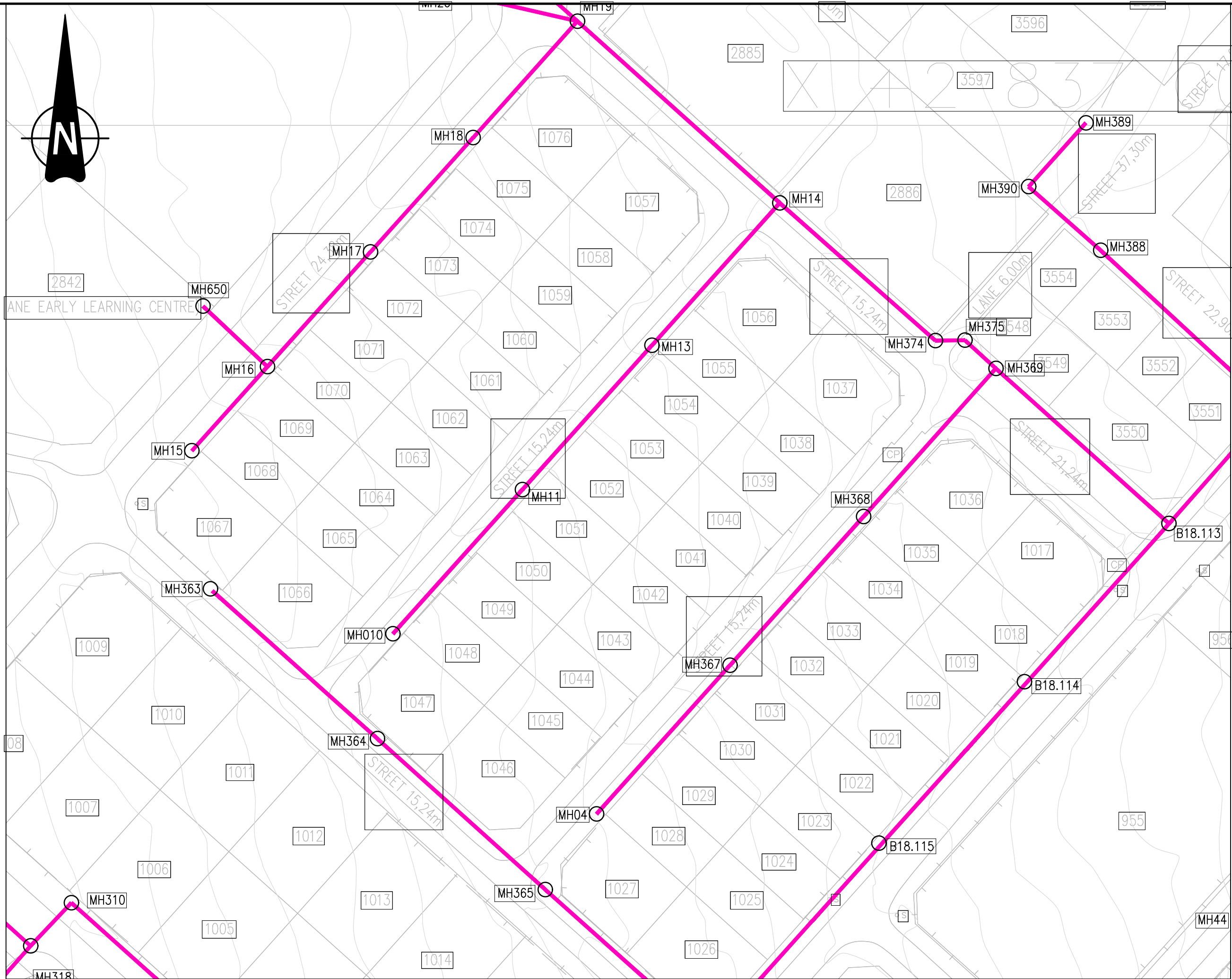
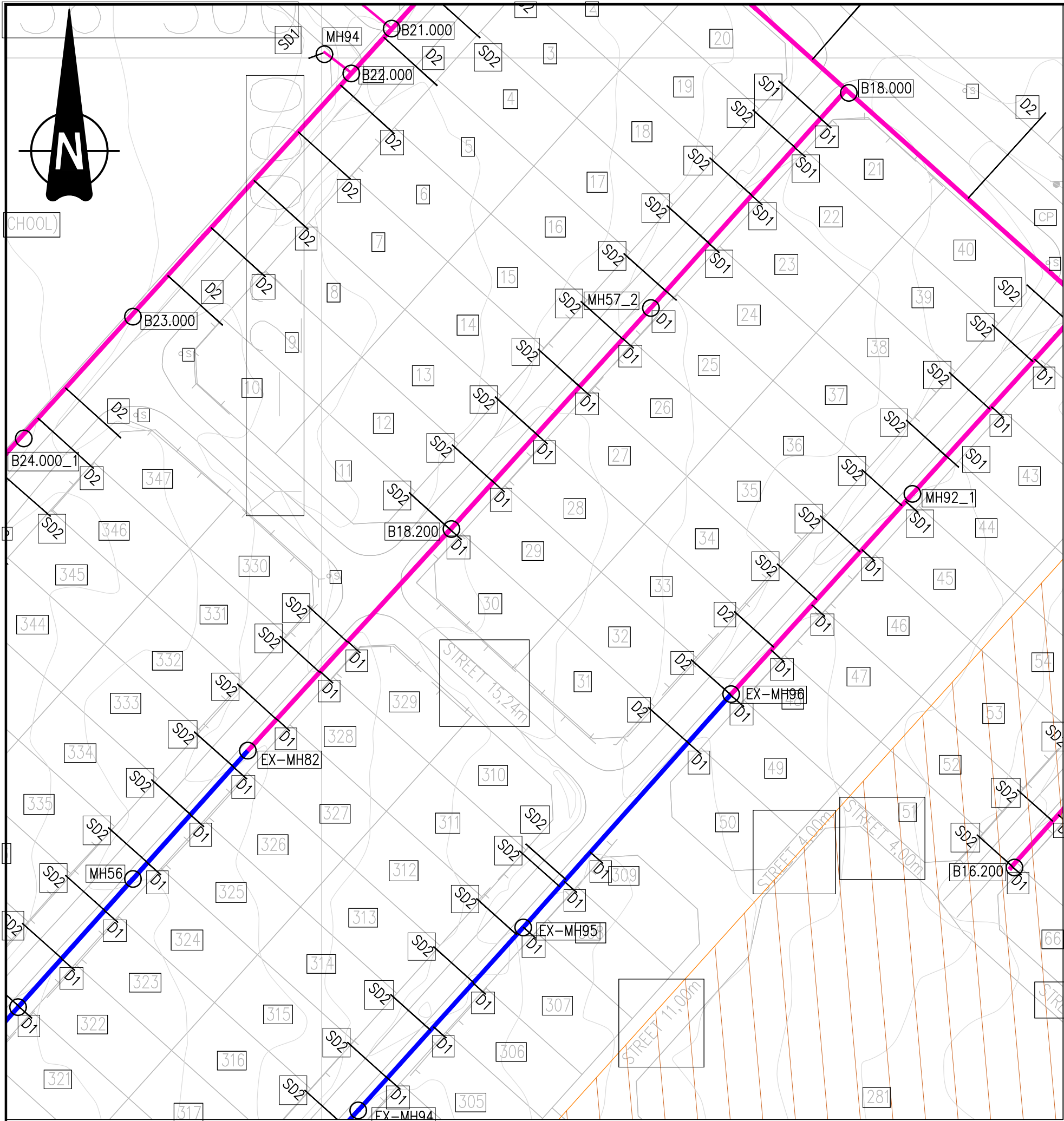
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- LEGEND:**
- FUTURE / LINK SEWER
- EXISTING SEWER PIPELINE
- REBUILD PIPELINE & MH
- NEW PIPELINE
- PHASE 2 – NOT INCLUDED
IN THIS CONTRACT

[illegible]

DRAWING No.			
LSO-228-SW-LS44			
SHEET	44	of	51
SCALE:		REVISION No:	
1:1000		0	



NOTES:

1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.

2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)

3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.

4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)

5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.

6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

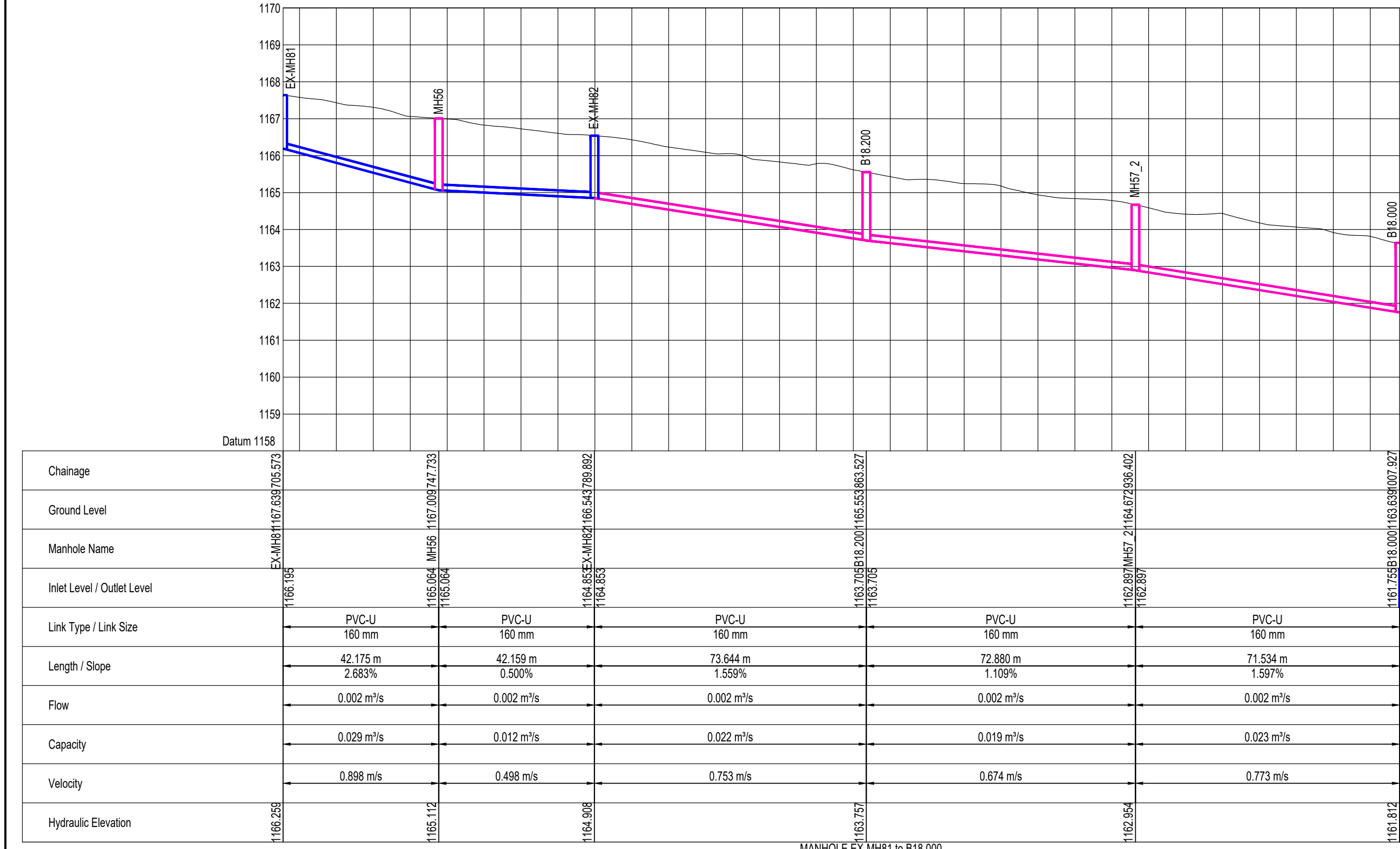
FUTURE / LINK SEWER

EXISTING SEWER PIPELINE

REBUILD PIPELINE & MH

NEW PIPELINE

PHASE 2- NOT INCLUDED IN THIS CONTRACT



RECORD OF CONSTRUCTION				DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M
No.	REVISIONS	CHK'D	DATE						
0	ISSUED FOR TENDER	K.M	05-2024					DESIGN CHECKED	K.M
								DRAWN	M.M
								DRAWING CHECKED	K.M

LSO

CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040

Tel: 012 803 0961

PROJECT TITLE:

TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:

PHASE 2
SEWER LONGSECTION 44
MANHOLE EX-MH81 to B18.000 & MH10 to B18.113

Rustenburg

Local Municipality

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT

DATE

05-2024

ENGINEER

DATE

DRAWING No.

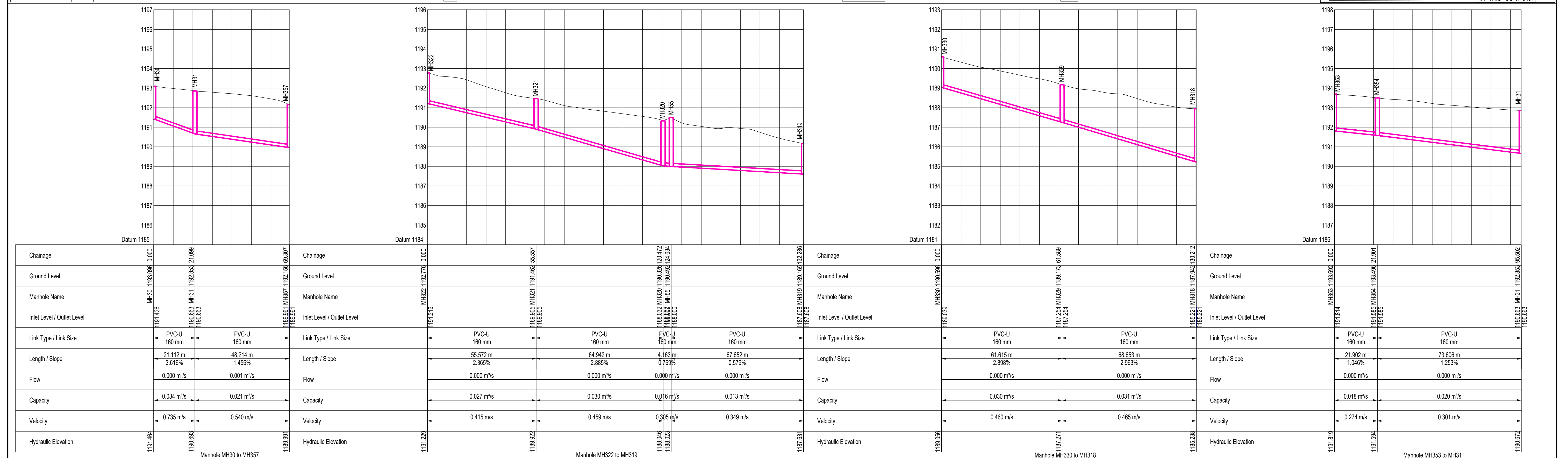
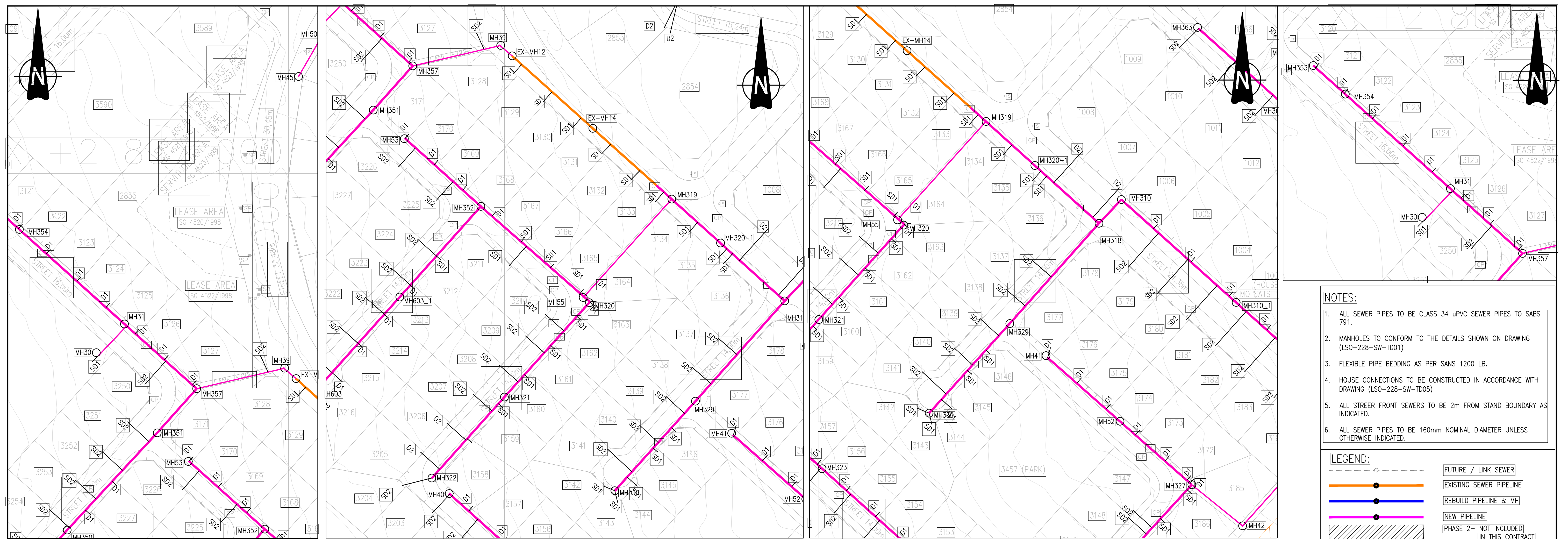
LSO-228-SW-LS44

SHEET 44 of 51

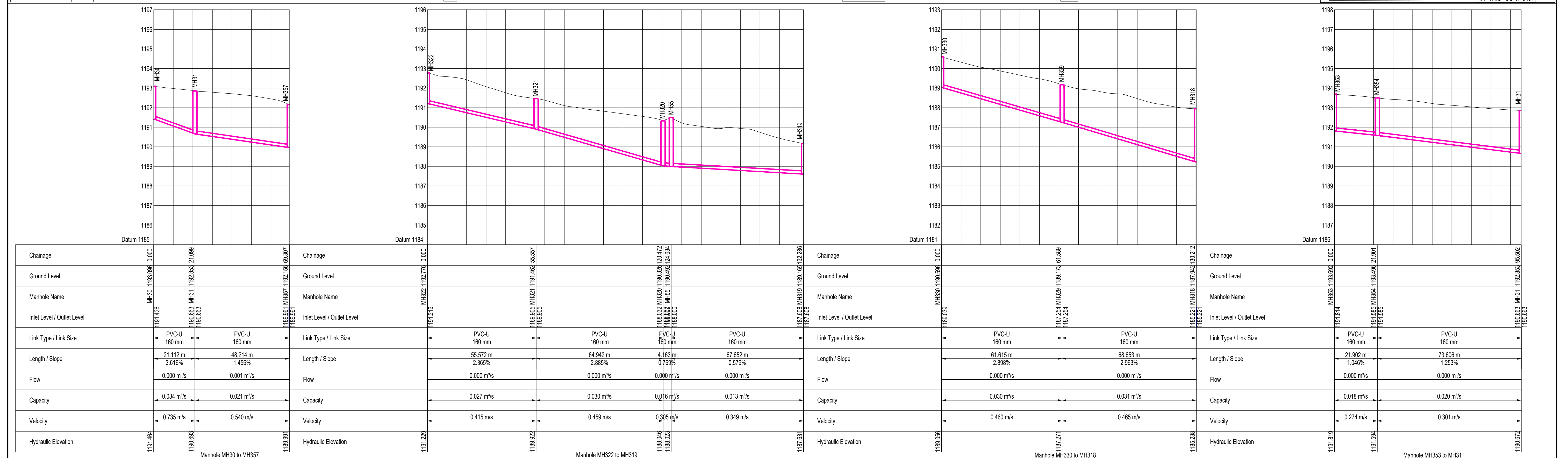
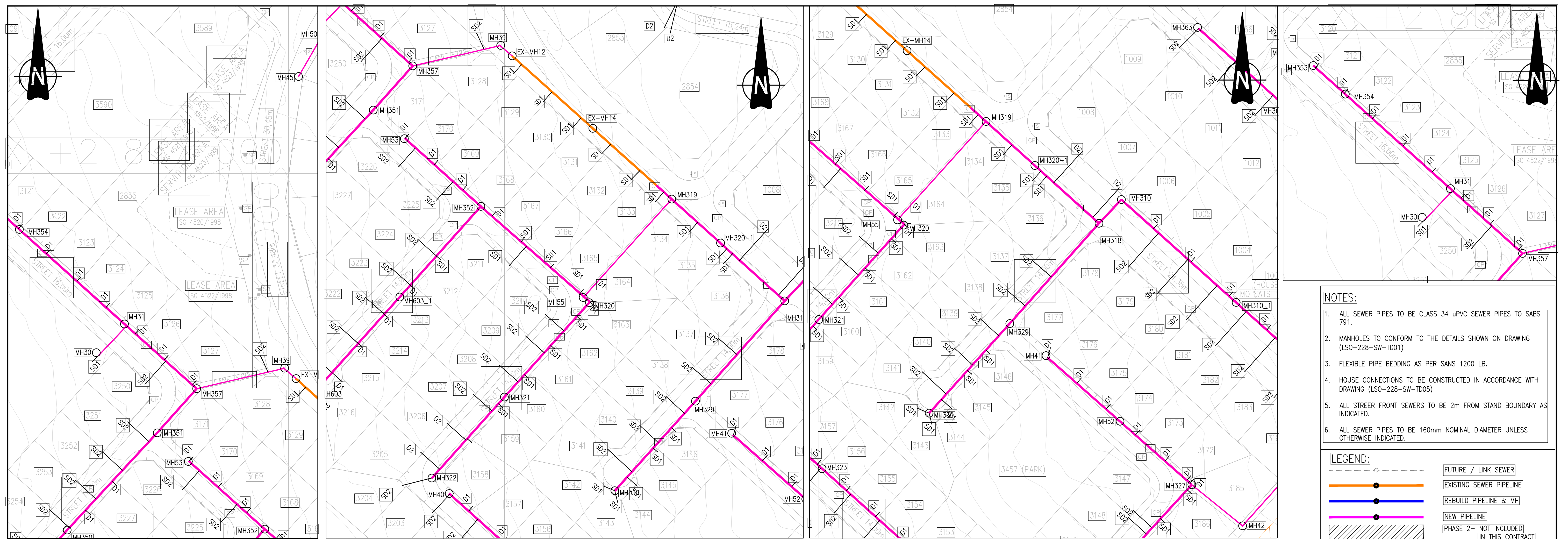
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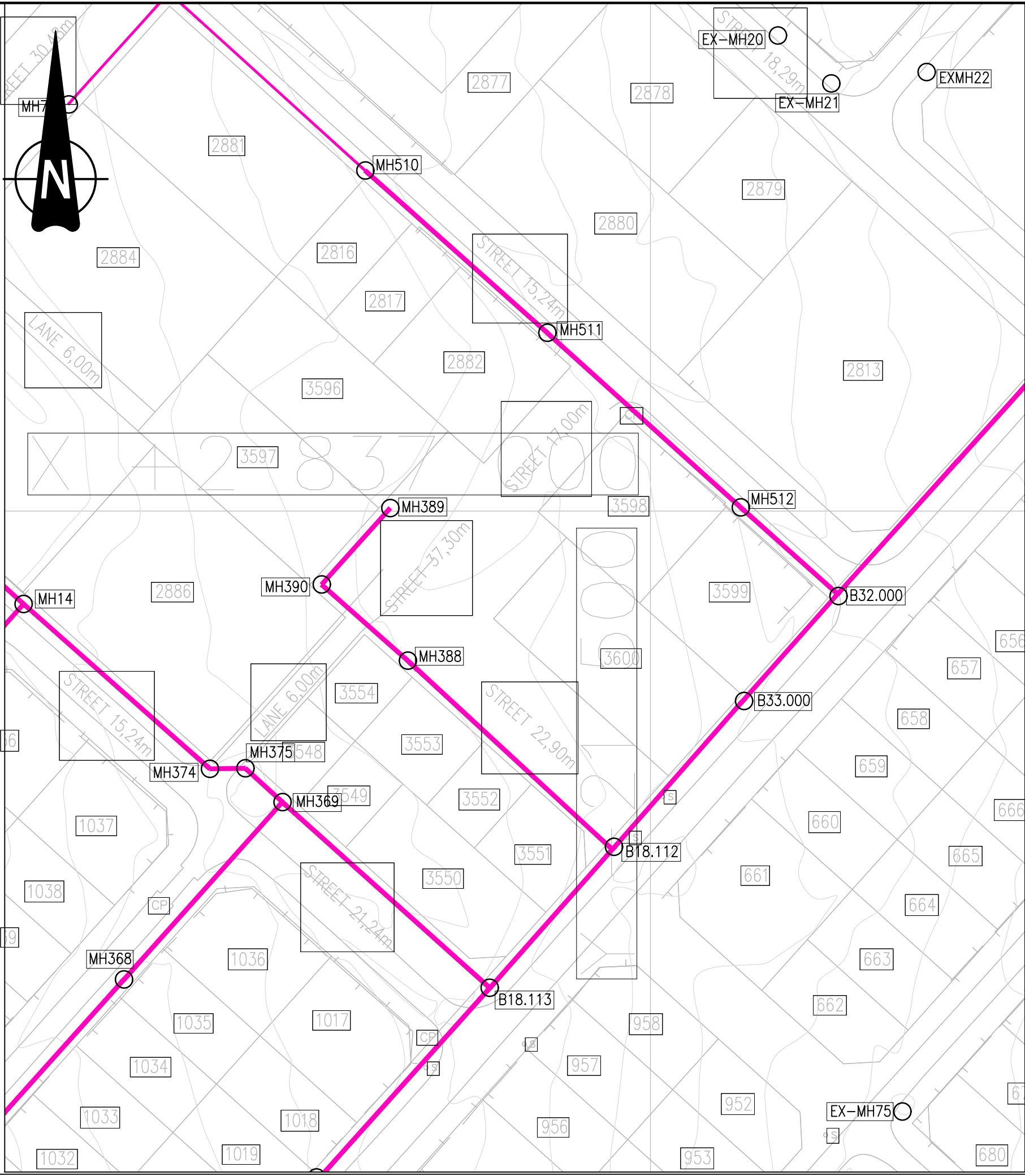
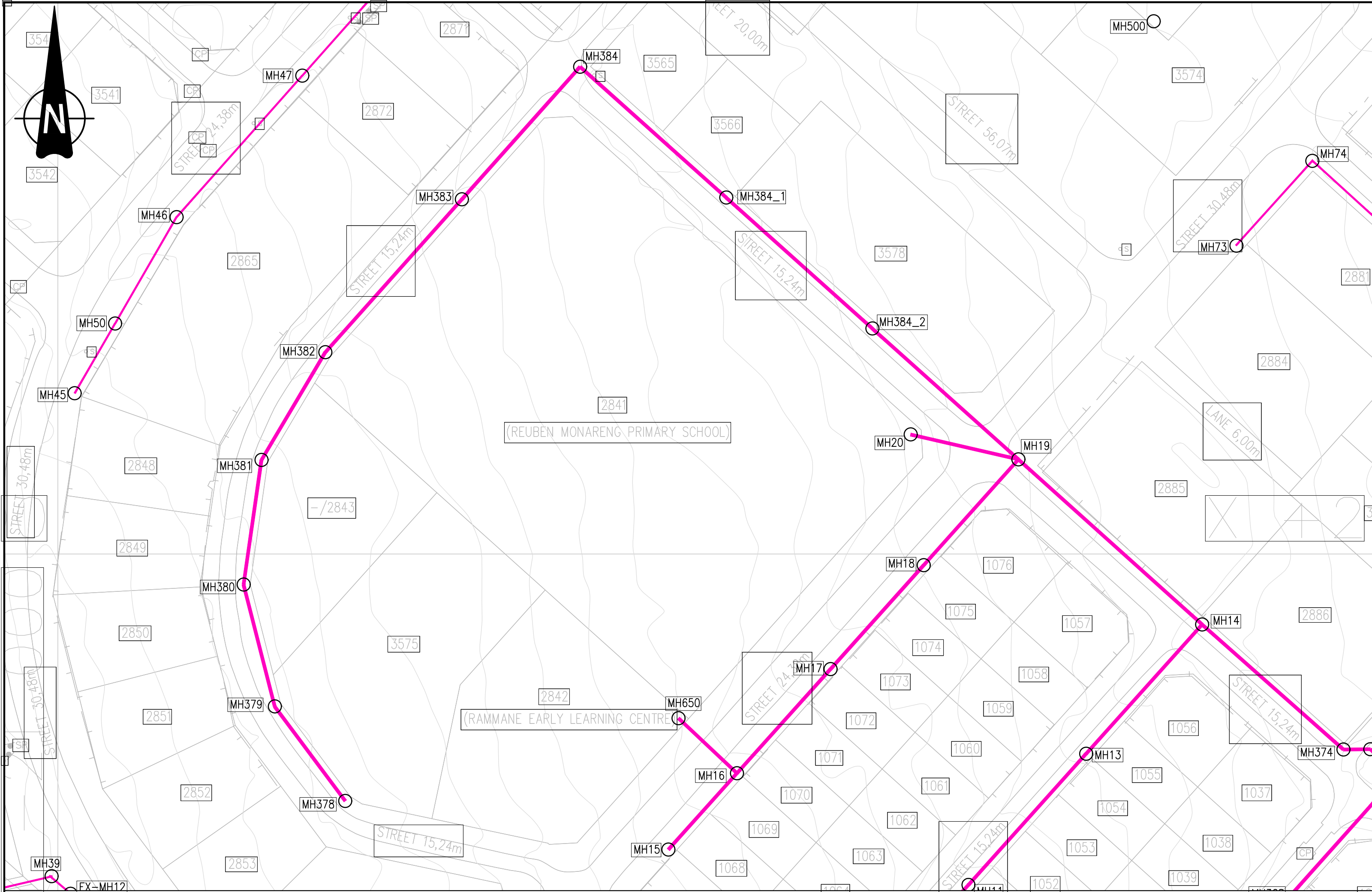
REVISION No.

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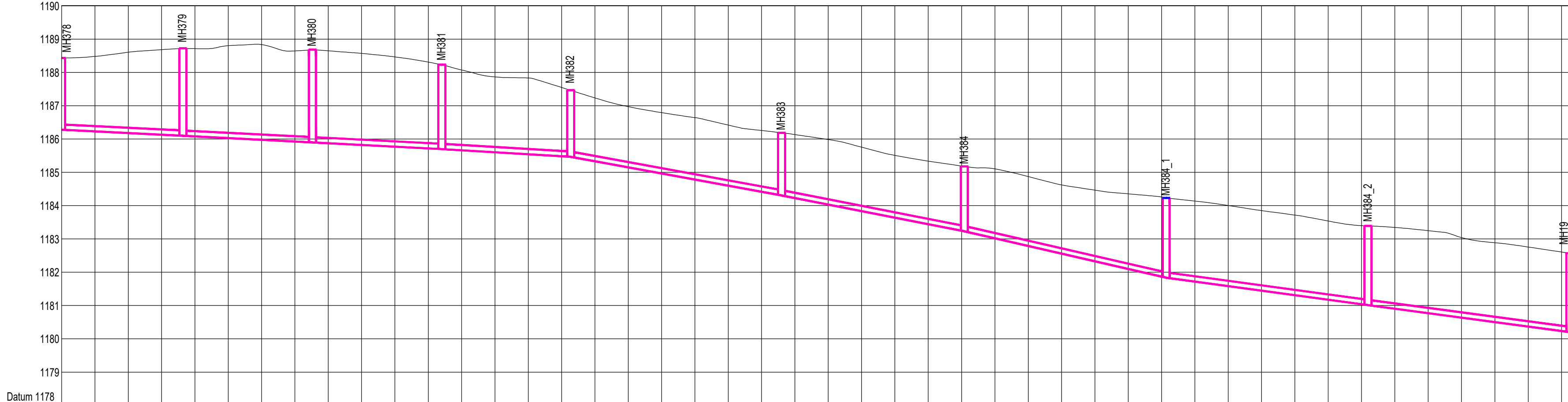
RECORD OF CONSTRUCTION					DEPARTMENT		APPROVED	DESIGNATION	DATE	DESIGNED	M.M	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE:			Rustenburg Local Municipality P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607			ISSUED FOR APPROVAL (Full signature)		DRAWING No.						
No.	REVISIONS	CHK'D	DATE				DESIGN CHECKED	K.M	DRAWN	M.M	DRAWING CHECKED		K.M	TLHABANE AC SEWER REPLACEMENT					PHASE 2 SEWER LONGSECTION 45 MANHOLE MH30 to MH357 ; MH322 to MH319 ;MH330 to MH318 & MH353 to MH31		CLIENT	DATE	SHEET	45	of	51	SCALE:
0	ISSUED FOR TENDER	K.M	05-2024																	05-2024							

[illegible]



- NOTES:
- ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 - MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 - FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 - HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 - ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 - ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:	
	FUTURE / LINK SEWER
	EXISTING SEWER PIPELINE
	REBUILD PIPELINE & MH
	NEW PIPELINE
	PHASE 2- NOT INCLUDED IN THIS CONTRACT



Chainage	MH378 1182.424 0.000	MH379 1182.722 36.383	MH380 1182.883 75.235	MH381 1182.908 114.086	MH382 1182.719 152.719	MH383 1182.005 186.005	MH384 1182.034 219.034	MH384_1 1182.333 252.333	MH384_2 1182.032 285.032	MH19 1182.253 322.253
Ground Level	1182.424	1182.722	1182.883	1182.908	1182.719	1182.005	1182.034	1182.333	1182.032	1182.253
Manhole Name	MH378	MH379	MH380	MH381	MH382	MH383	MH384	MH384_1	MH384_2	MH19
Inlet Level / Outlet Level	1182.282	1182.100	1182.901	1182.700	1182.468	1182.333	1182.034	1182.034	1182.032	1182.253
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm
Length / Slope	36.383 m 0.500%	38.853 m 0.512%	38.852 m 0.517%	38.654 m 0.598%	63.277 m 1.834%	54.839 m 1.363%	60.565 m 1.338%	60.555 m 1.338%	60.555 m 1.338%	65.041 m 2.022%
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.000 m³/s	0.001 m³/s	0.001 m³/s	0.001 m³/s	0.001 m³/s	0.000 m³/s
Capacity	0.012 m³/s	0.013 m³/s	0.013 m³/s	0.014 m³/s	0.024 m³/s	0.025 m³/s	0.027 m³/s	0.021 m³/s	0.021 m³/s	0.025 m³/s
Velocity	0.265 m/s	0.267 m/s	0.268 m/s	0.283 m/s	0.536 m/s	0.654 m/s	0.690 m/s	0.601 m/s	0.679 m/s	0.000 m/s
Hydraulic Elevation	1182.282	1182.114	1182.915	1182.715	1182.466	1182.346	1182.273	1181.878	1181.063	1182.253

MANHOLE MH378 to MH19



Chainage	MH389 1175.357 0.000	MH390 1175.946 24.016	MH388 1175.425 50.936	B18.112 1176.230 116.230
Ground Level	1175.357	1175.946	1175.425	1176.230
Manhole Name	MH389	MH390	MH388	B18.112
Inlet Level / Outlet Level	1175.202	1175.804	1175.545	1176.230
Link Type / Link Size	PVC-U 160 mm	PVC-U 160 mm	PVC-U 160 mm	
Length / Slope	24.018 m 0.500%	26.919 m 0.502%	65.041 m 2.022%	
Flow	0.000 m³/s	0.000 m³/s	0.000 m³/s	
Capacity	0.012 m³/s	0.012 m³/s	0.025 m³/s	
Velocity	0.000 m/s	0.000 m/s	0.000 m/s	
Hydraulic Elevation	1175.202	1175.804	1175.545	1176.230

MANHOLE MH389 to B18.112

RECORD OF CONSTRUCTION			
No.	REVISIONS	CHK'D	DATE
01	ISSUED FOR APPROVAL	K.M.	01-2023

DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M.
				DESIGN CHECKED	K.M.
				DRAWN	M.M.
				DRAWING CHECKED	K.M.

LSO
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:
TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:
SEWER LONGSECTION 47
MANHOLE MH378 to MH19 & MH389 to B18.112

Rustenburg
Local Municipality

P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT: *Handwritten signature* DATE: 01-2023

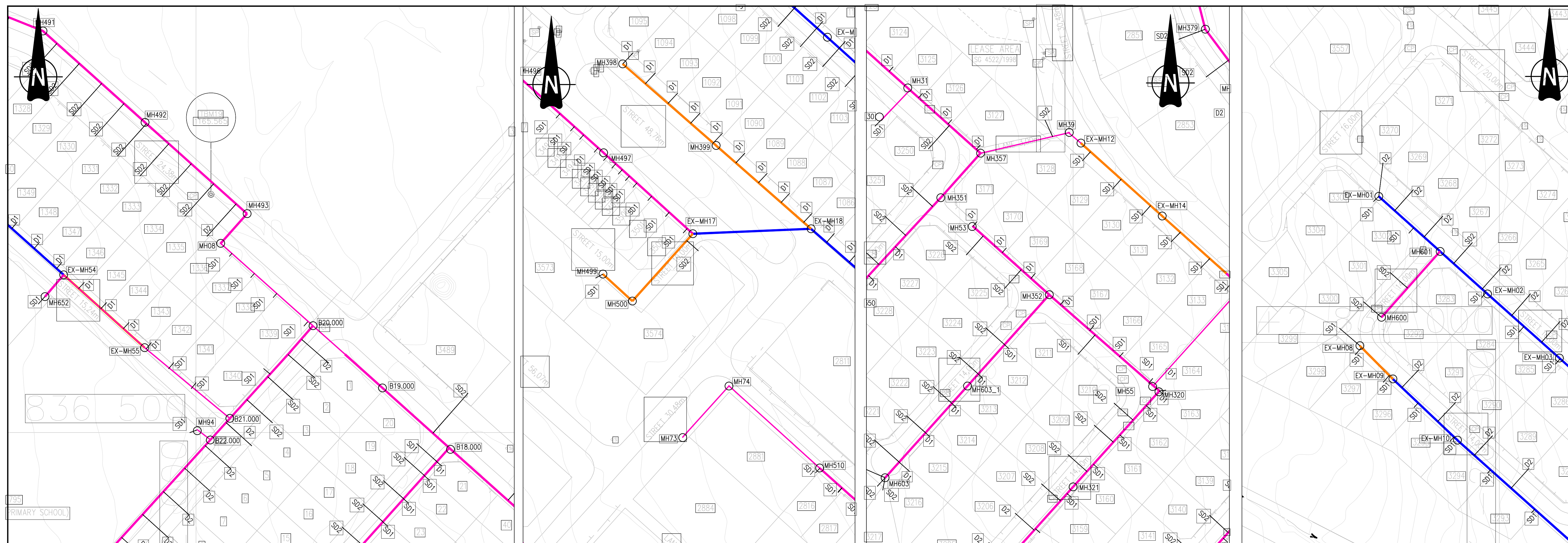
ENGINEER: *Handwritten signature* DATE:

DRAWING No.
LSO-228-SW-LS47

SHEET: 47 of 51

SCALE: 1:1000

REVISION No.: 0

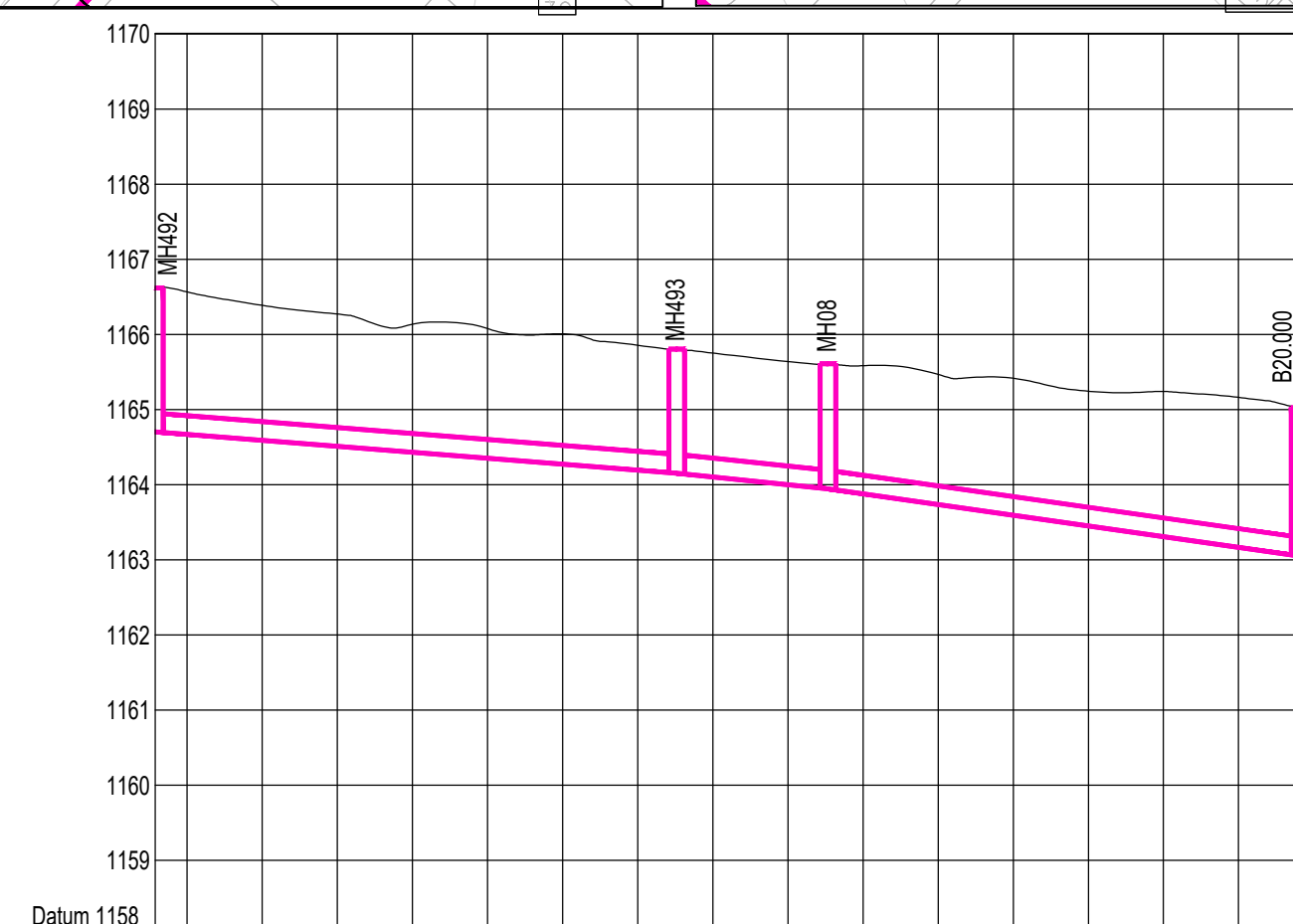


- NOTES:**

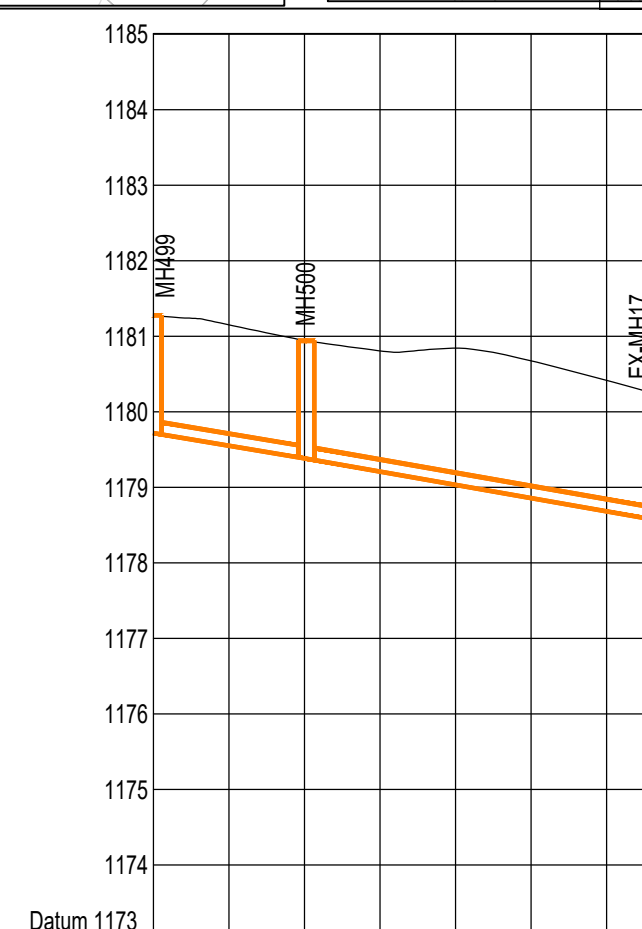
 1. ALL SEWER PIPES TO BE CLASS 34 uPVC SEWER PIPES TO SABS 791.
 2. MANHOLES TO CONFORM TO THE DETAILS SHOWN ON DRAWING (LSO-228-SW-TD01)
 3. FLEXIBLE PIPE BEDDING AS PER SANS 1200 LB.
 4. HOUSE CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH DRAWING (LSO-228-SW-TD05)
 5. ALL STREER FRONT SEWERS TO BE 2m FROM STAND BOUNDARY AS INDICATED.
 6. ALL SEWER PIPES TO BE 160mm NOMINAL DIAMETER UNLESS OTHERWISE INDICATED.

LEGEND:

Dashed line: FUTURE / LINK SEWER
 Orange line with black dot: EXISTING SEWER PIPELINE
 Blue line with black dot: REBUILD PIPELINE & MH
 Magenta line with black dot: NEW PIPELINE
 Hatched box: PHASE 2 - NOT INCLUDED IN THIS CONTRACT



Chainage		165.618	165.945	166.150
Ground Level				
Manhole Name		MH452	MH493	MH498
Inlet Level / Outlet Level		1164.106	1164.138	1163.948
Link Type / Link Size		PVC-U 250 mm	PVC-U 250 mm	PVC-U 250 mm
Length / Slope		69.443 m 0.793%	20.137 m 1.043%	62.752 m 1.423%
Flow		0.035 m³/s	0.035 m³/s	0.035 m³/s
Capacity		0.051 m³/s	0.059 m³/s	0.069 m³/s
Velocity		1.308 m/s	1.455 m/s	1.639 m/s
Hydraulic Elevation		164.933	164.301	164.200

[illegible]

Chainage	MH53 +92.381 0.000		MH352 +191.514 52.071
Ground Level			
Manhole Name			
Inlet Level / Outlet Level	+190.464		+189.713 MH352 +191.514 52.071 +189.713
Link Type / Link Size	PVC-U 160 mm		PVC-U 160 mm
Length / Slope	52.077 m 1.442%		70.094 m 2.445%
Flow	0.000 m³/s		0.000 m³/s
Capacity	0.021 m³/s		0.028 m³/s
Velocity	0.323 m/s		0.516 m/s
Hydraulic Elevation	+190.472		+189.724



Chainage					
Ground Level					
Manhole Name	M#600	1205.903	0.000		
Inlet Level / Outlet Level		1205.346		1201.758	1201.758
Link Type / Link Size			PVC-U 160 mm		
Length / Slope			44.875 m 8.021%		
Flow			0.000 m³/s		
Capacity			0.051 m³/s		
Velocity			0.000 m/s		
Hydraulic Elevation		1205.346		1201.758	

[illegible]

LSO 
CONSULTING ENGINEERS

Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets,
Murrayfield, Pretoria, 0184

P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040
Tel: 012 803 0961

PROJECT TITLE:

TLHABANE AC SEWER REPLACEMENT

DRAWING TITLE:

TITLE: PHASE 2
SEWER LONGSECTION 49
MANHOLE MH492 to B20.000 ; MH499 to EX-MH17 ; MH53 to
MH55 & MH600 to MH601.



P.O. Box 16
Rustenburg
0300
Tel: 014 590 3607

ISSUED FOR APPROVAL
(Full signature)

CLIENT	DATE
	05-2024
ENGINEER	DATE

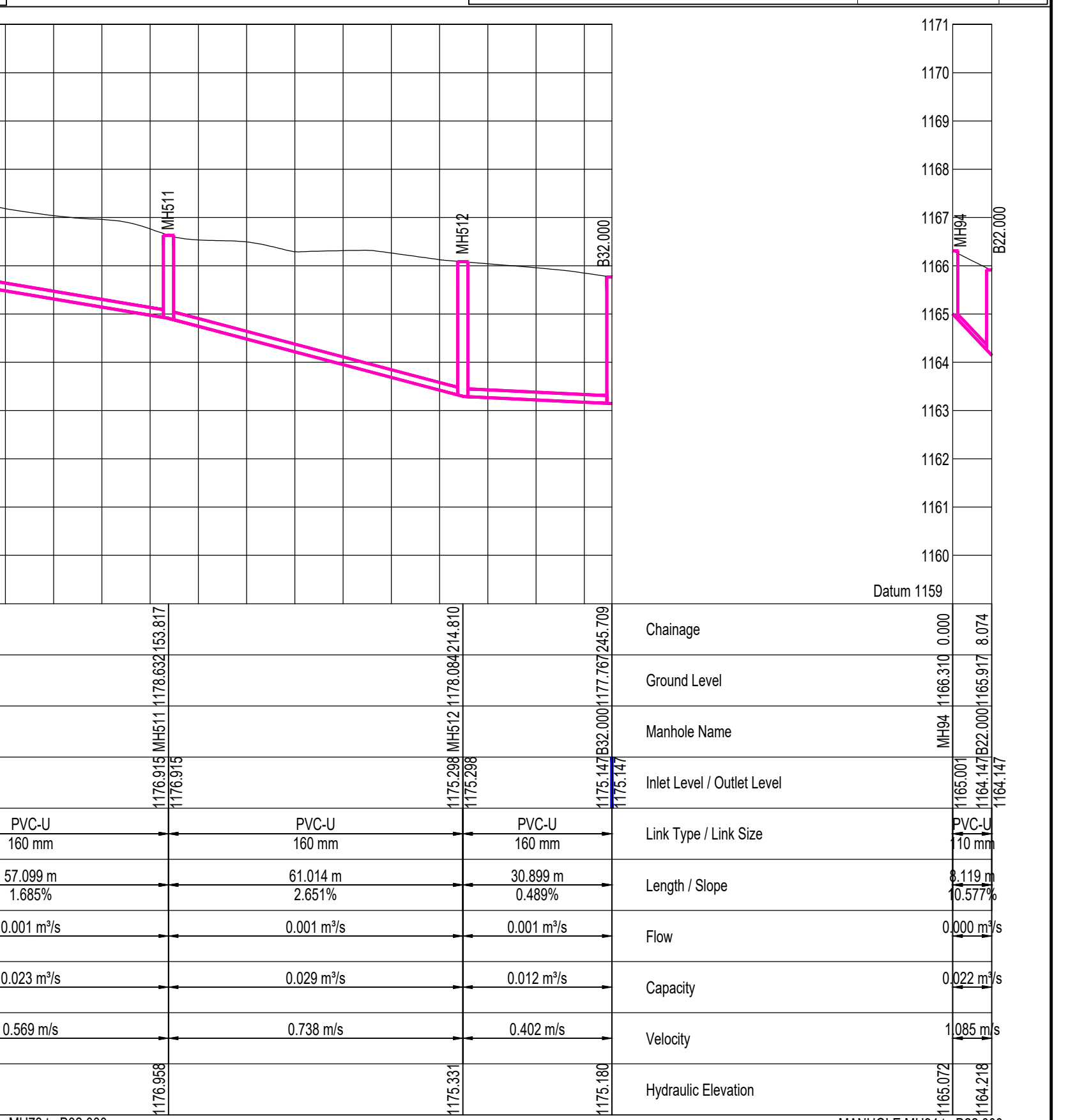
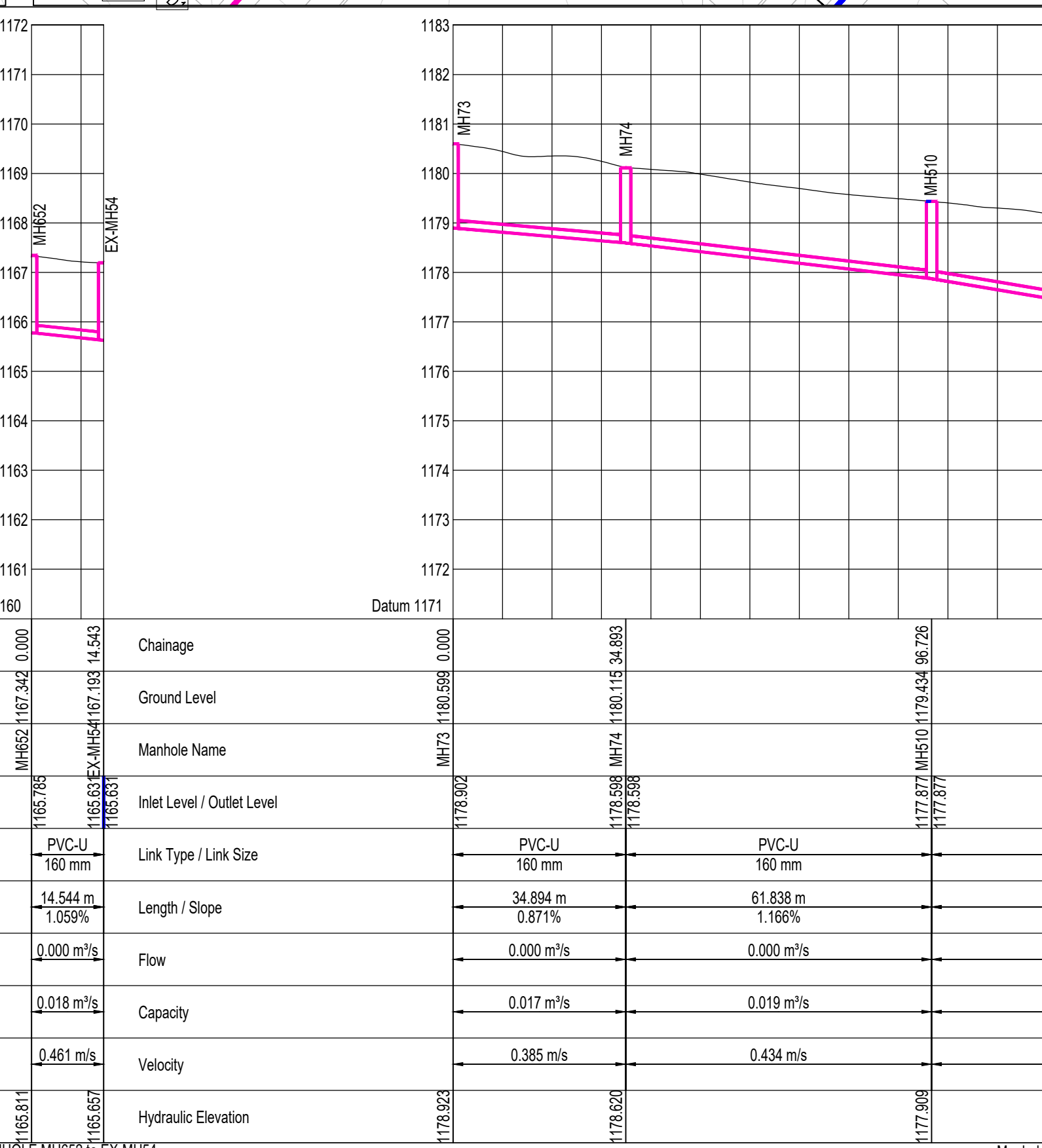
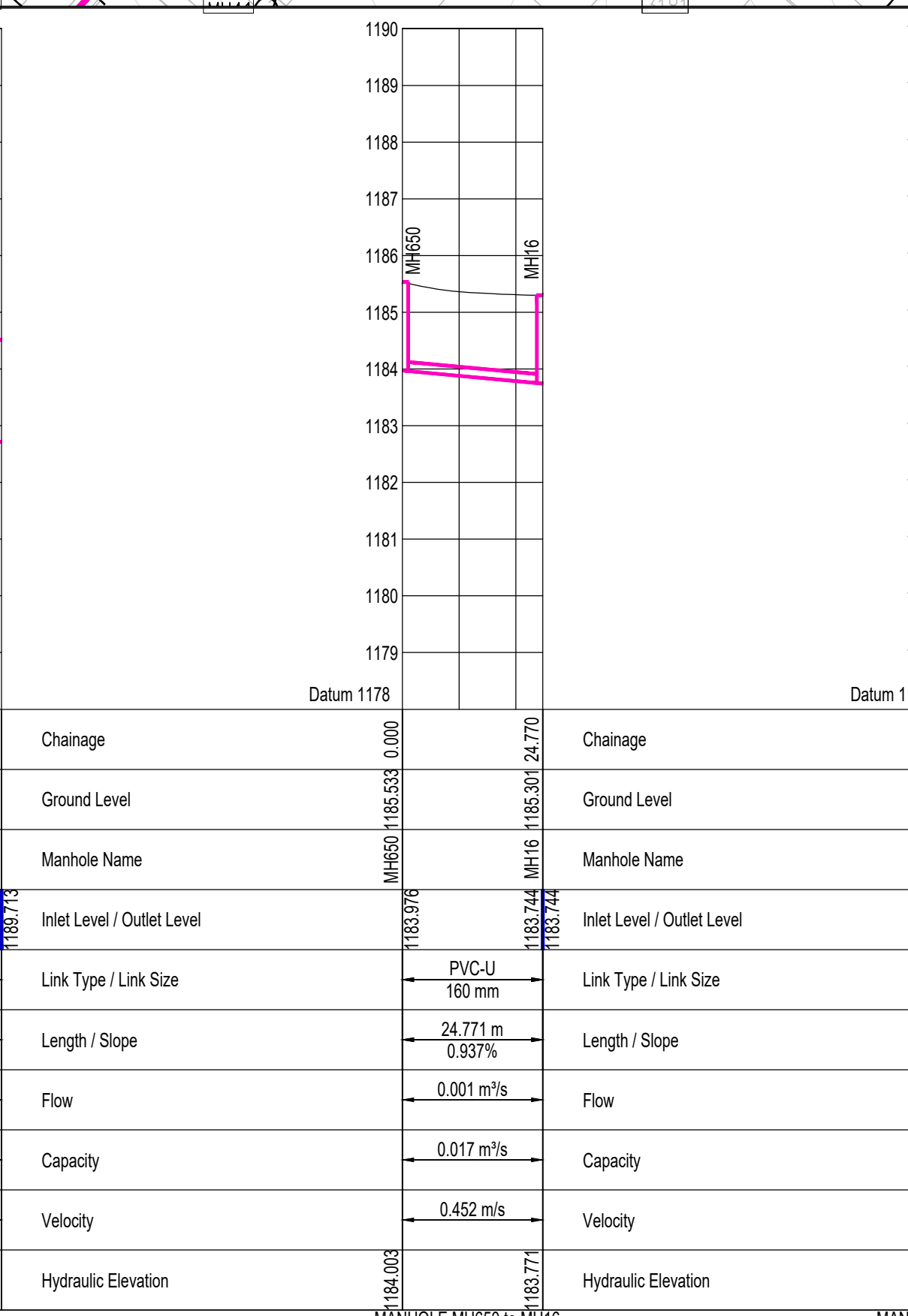
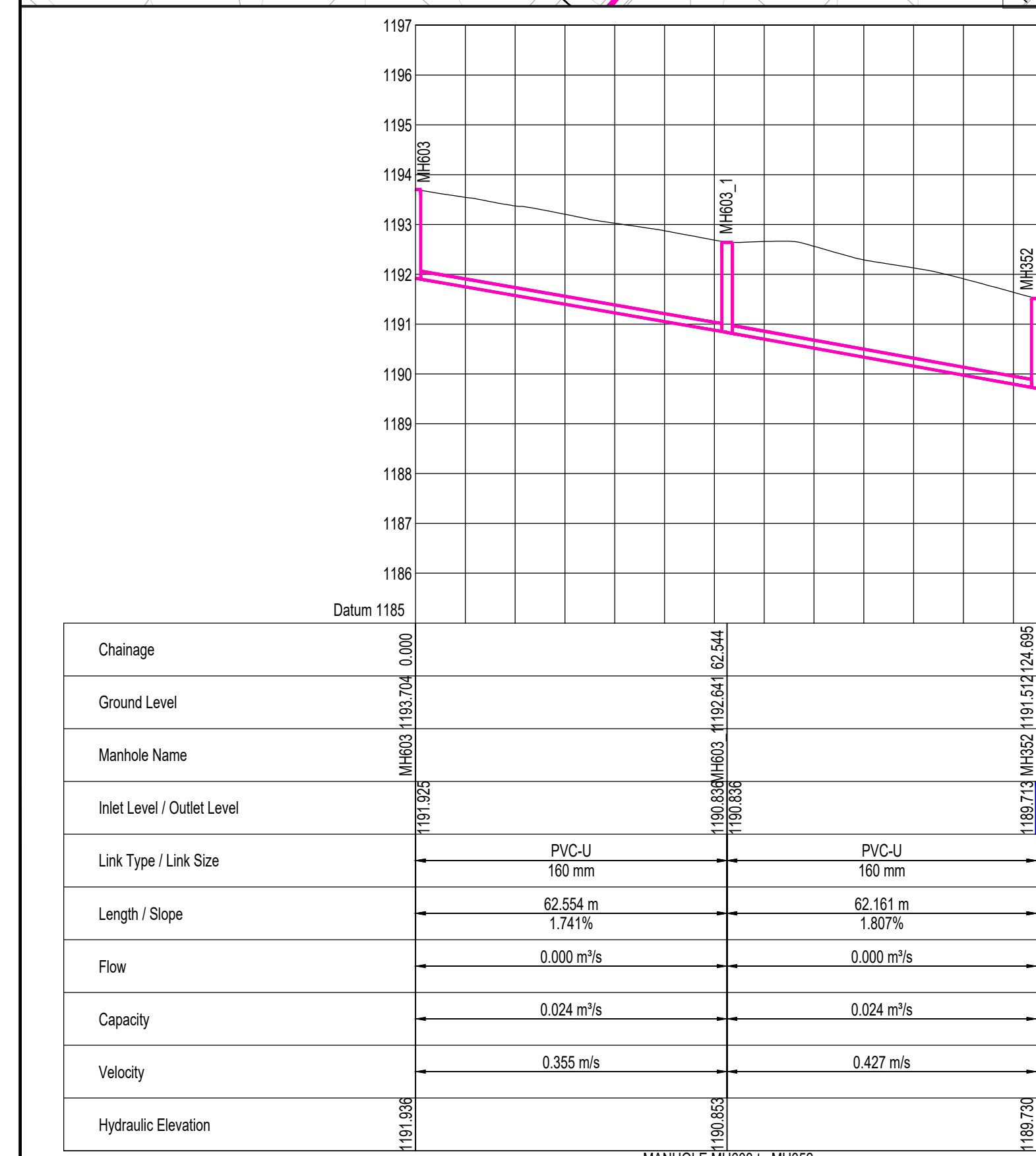
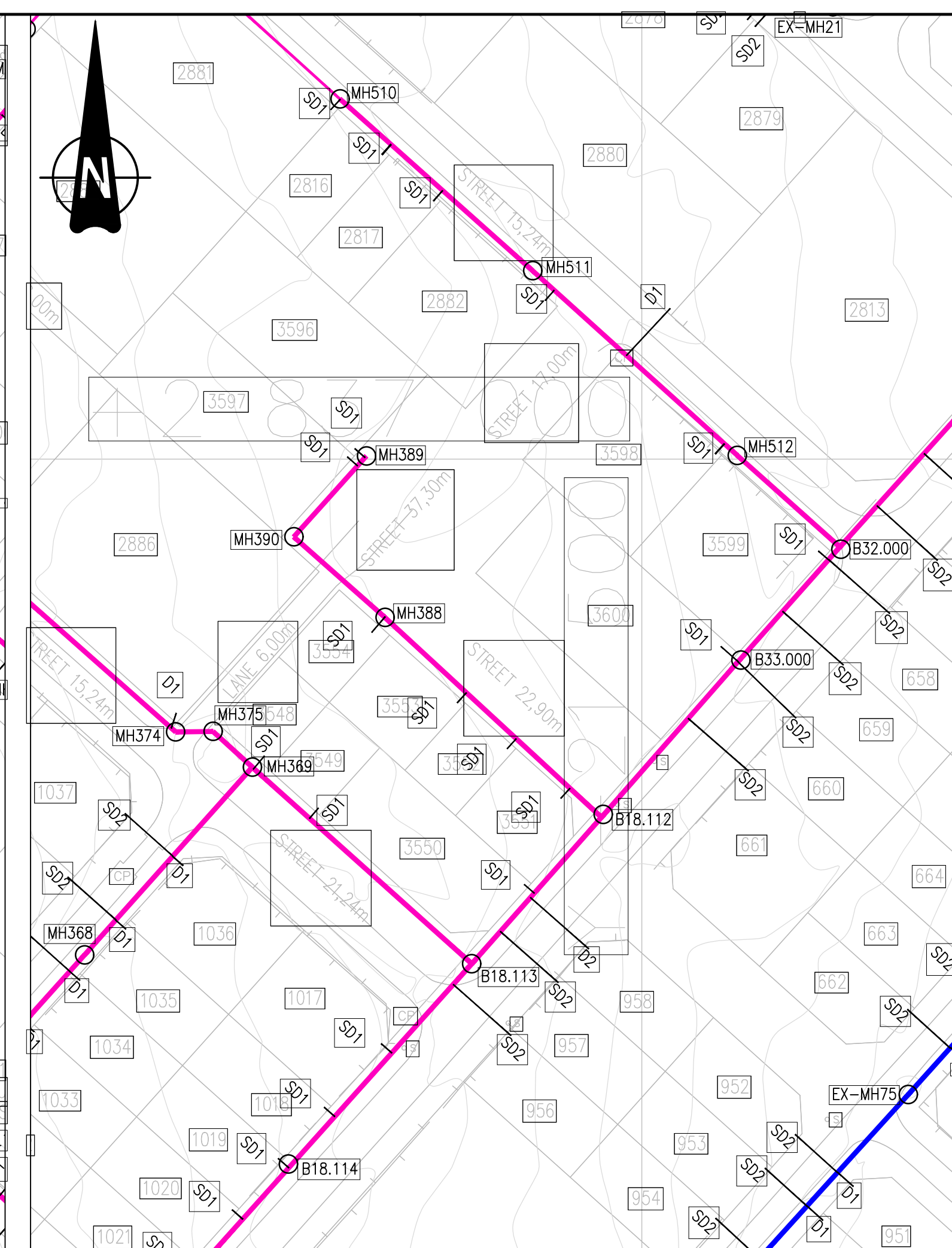
DRAWING No.

LSO-228-SW-LS49

SHEET 49 of 51

SCALE: _____	REVISION No: _____
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REVISION No:



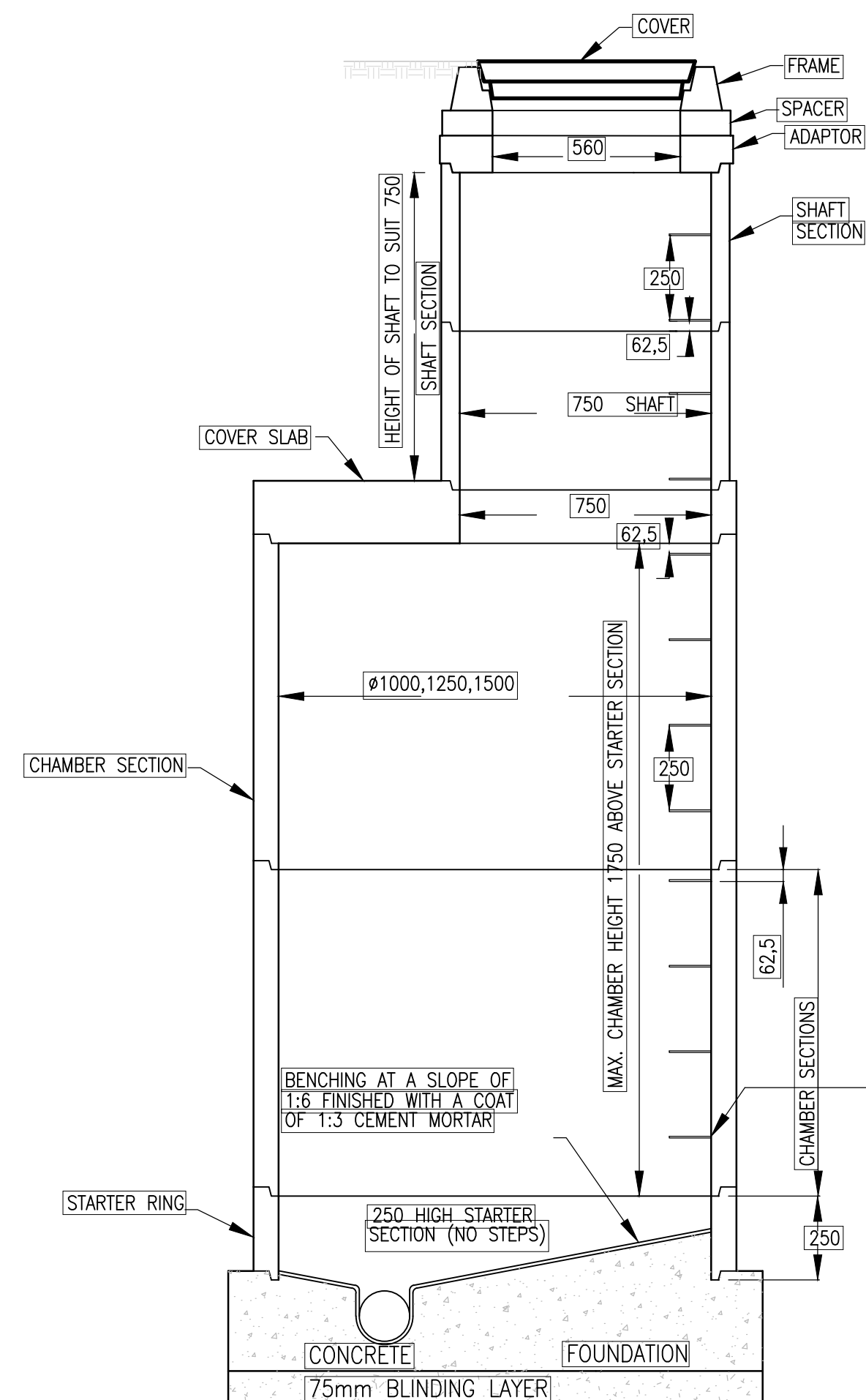
RECORD OF CONSTRUCTION				MANHOLE MH603 to MH352		MANHOLE MH652 to EX-MH54		MANHOLE MH652 to EX-MH54		MANHOLE MH73 to B32.000		Manhole MH/3 to B32.000		Manhole MH/4 to B22.000			
No.	REVISIONS	CHK'D	DATE	DEPARTMENT	APPROVED	DESIGNATION	DATE	DESIGNED	M.M	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield,Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961		Rustenburg Local Municipality P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607		(Full signature) CLIENT _____ DATE _____ 05-2024 ENGINEER _____ DATE _____		DRAWING No. LSO-228-SW-LS51 SHEET 51 of 51 SCALE: 1:1000 REVISION No. 0	
0	ISSUED FOR TENDER	K.M	05-2024					DESIGN CHECKED	K.M								
								DRAWN	M.M								
								DRAWING CHECKED	K.M								
PROJECT TITLE:										TLHABANE AC SEWER REPLACEMENT							
DRAWING TITLE:										PHASE 2 SEWER LONGSECTION 50 MANHOLE MH603 MH352 & MH650 to MH16 MH652 to EX-MH54 & MH94 to B22.000 & MH73 to B32.000							

-
- REINFORCED CONCRETE ROOF SLAB (MIN 250)
- MIN. 250
- DESIGNED TO SUIT
- REINFORCED CONCRETE OR DOUBLE BRICK CHAMBER WALLS (SACRIFICIAL LAYER MIN 50mm)
- SHAFT SECTION

MH_TYPE : ANGLE PIPE DIAM : 250 & 300	MH_TYPE : SINGLE_JUNCTION PIPE DIAM : 150, 200, 250 & 300

1500 MANIFOLD	MH TYPE : DOUBLE JUNCTION PIPE DIAM : 150 & 200		MH TYPE : SINGLE JUNCTION / ANGLE PIPE DIAM : 150 & 200	

1/30 MAINFOLD	MH TYPE : DOUBLE JUNCTION PIPE DIAM : 250 & 300		MH TYPE : DOUBLE JUNCTION PIPE DIAM : 250 & 300	
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COVER

FRAME

SPACER ADAPTOR

COVER SLAB

560

750

625

250

1750

CHAMBER SECTION

250 HIGH STARTER SECTION (NO STEPS)

CEMENT MORTAR BENCHING

STARTER RING

CONCRETE

75mm BLINDING LAYER

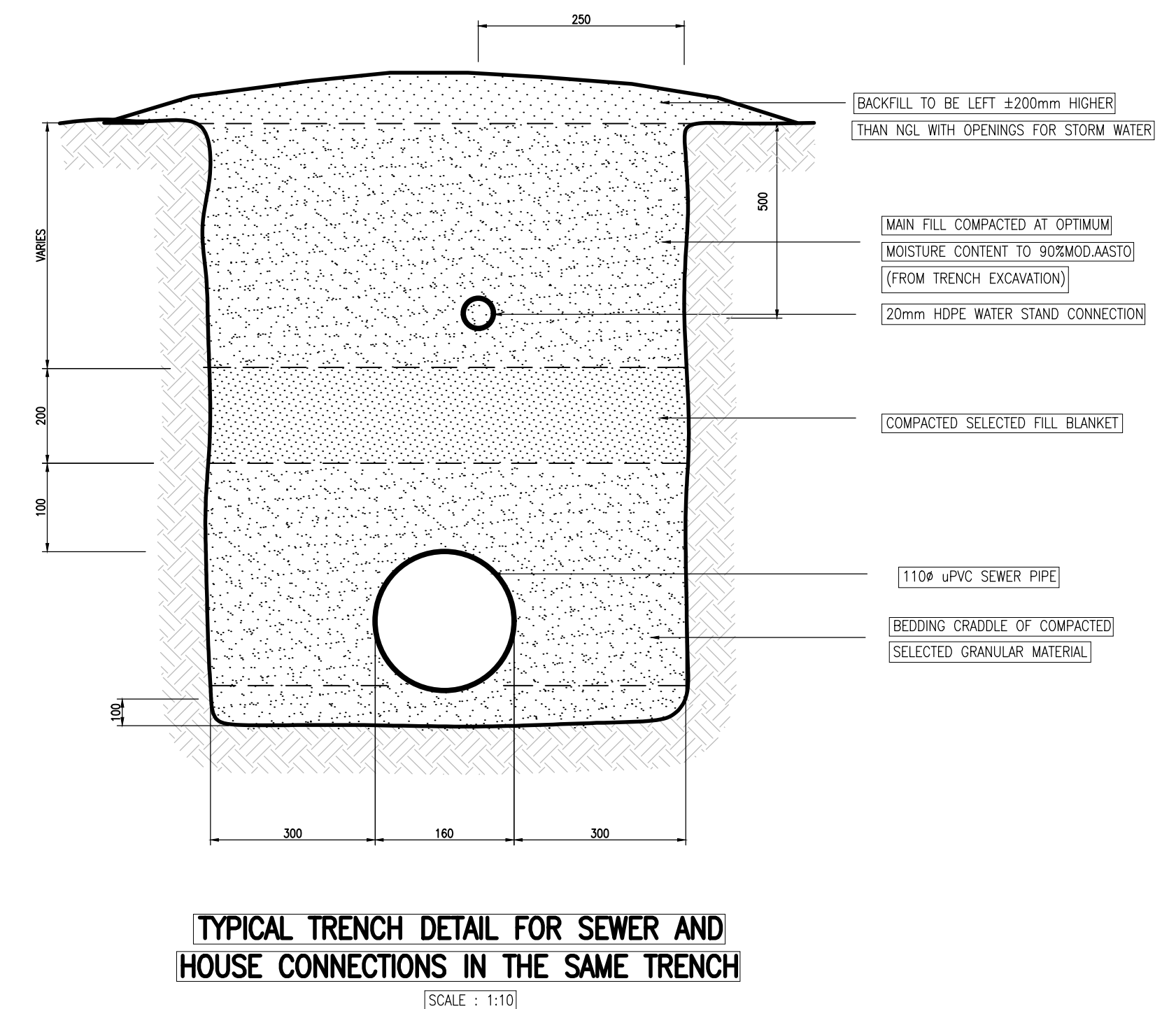
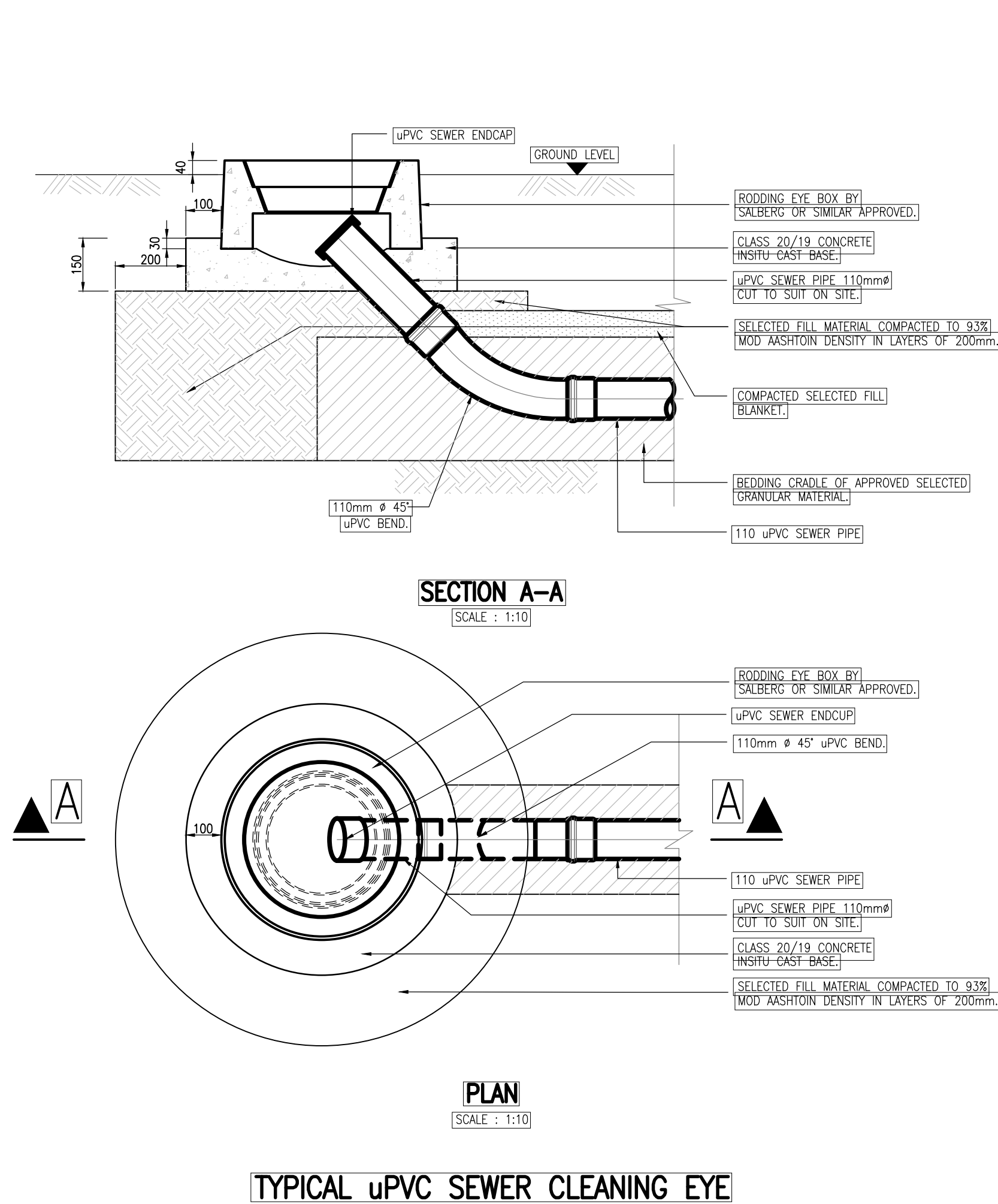
FOUNDATION

CHAMBER SECTIONS

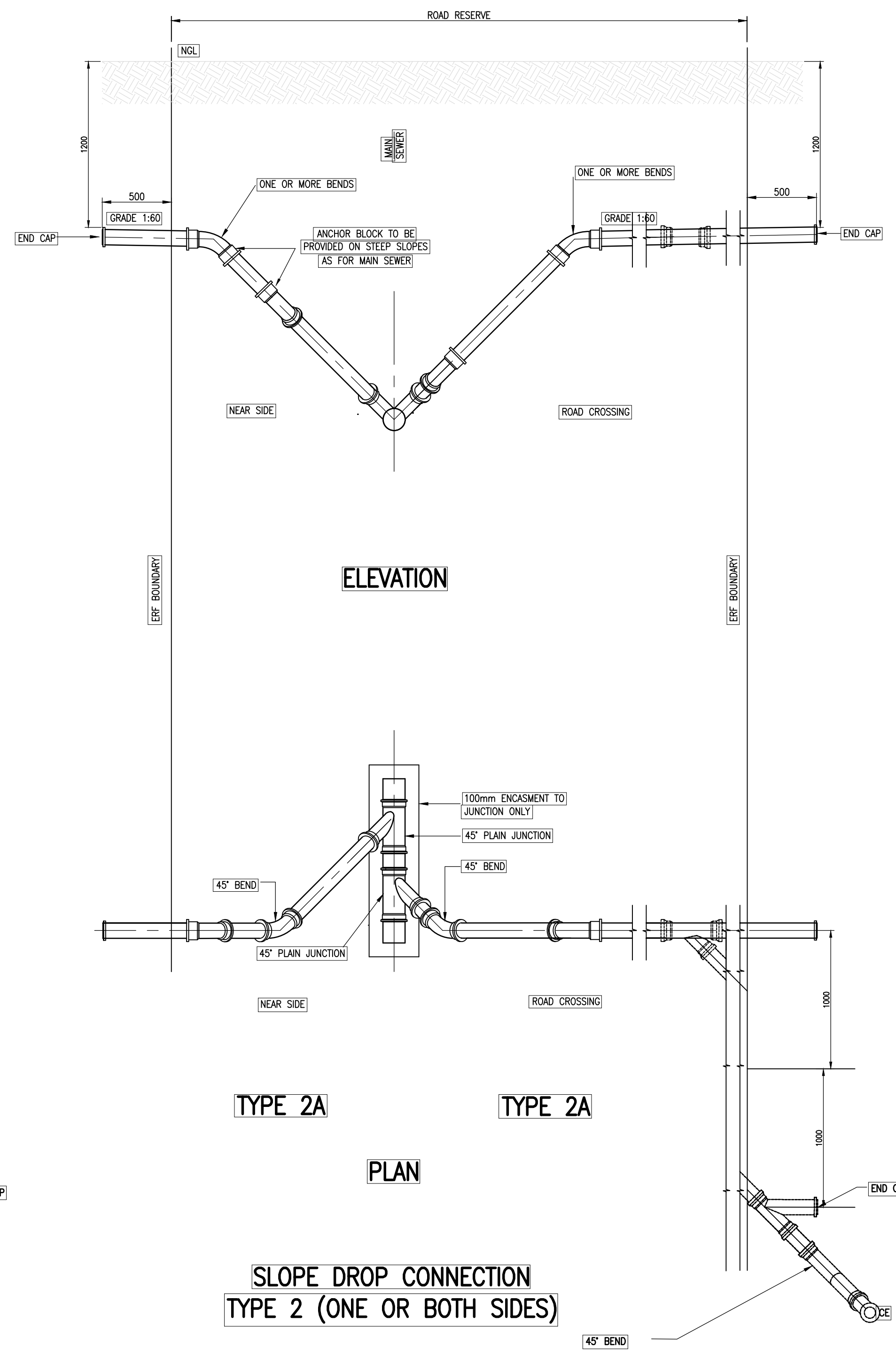
BOTTOM RUNG OF EACH SECTION FOR LEFT FOOT

Ø1000, 1250, 1500

[RECORD OF CONSTRUCTION]				[DEPARTMENT]		[APPROVED]		[DESIGNATION]		[DATE]		[DESIGNED]		[M.M]		Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE:				P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607				[ISSUED FOR TENDER (Full signature)]				[DRAWING No.]			
[No.]		[REVISIONS]		[CHK'D]		[DATE]						[DESIGN CHECKED]		[K.M]			LSO-228-SW-TD01															
[0]		[ISSUED FOR TENDER]		[K.M]		05-2024											[SHEET] of															
																	[SCALE]															
																	[REVISION No.]															
																AS-SHOWN																
																[0]																
DRAWING TITLE:												PHASE 2 TYPICAL MANHOLE DETAILS				ENGINEER				[05-2024]												



RECORD OF CONSTRUCTION				[DEPARTMENT]	[APPROVED]	[DESIGNATION]	[DATE]	[DESIGNED]	[M.M]	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield, Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT	Rustenburg Local Municipality P.O. Box 16 Rustenburg 0300 Tel: 014 590 3807	ISSUED FOR TENDER (Full signature)	DRAWING No. LSO-228-SW-TD02							
[No.]	[REVISIONS]	[CHK'D]	[DATE]												[DESIGN CHECKED]	[K.M]					
[0]	ISSUED FOR TENDER	[K.M]	05-2024																		
								[DRAWN]	[M.M]												
								[DRAWING CHECKED]	[K.M]												
																				CLIENT	
														[Full signature]	DATE						
															05-2024						
														ENGINEER	DATE						
														[SHEET] of							
														SCALE:	AS-SHOWN	[REVISION No.]					
																1					



[RECORD OF CONSTRUCTION]					[DEPARTMENT]		[APPROVED]	[DESIGNATION]	[DATE]	[DESIGNED]	[M.M]	LSO CONSULTING ENGINEERS Office 101A, Murrayfield Corner, c/o Rossouw & Rubida Streets, Murrayfield,Pretoria, 0184 P.O.Box 76144, Lynnwood Ridge, Pretoria, 0040 Tel: 012 803 0961	PROJECT TITLE: TLHABANE AC SEWER REPLACEMENT		Rustenburg Local Municipality P.O. Box 16 Rustenburg 0300 Tel: 014 590 3607	(Full signature)		[DRAWING No.] LSO-228-SW-TD03	
No.]	[REVISIONS]	[CHK'D]	[DATE]					[DESIGN CHECKED]	[K.M]	[CLIENT]	[DATE]		[SHEET]	of		[SCALE]	[REVISION No.]		
[0]	[ISSUED FOR TENDER]	[K.M]	[05-2024]					[DRAWN]	[M.M]										